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May 12, 2015

Paul:

I have enclosed our report "Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples" for the samples collected April 13, 15, and 17, 2015. A summary of the results of this testing follows (note: TUc = 100/EC25 or 100/IC25):

Chronic Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 64.2% site water, resulting in 1.6 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	64.2% site water
TUc =	<1.0	1.6

Chronic Effects of Lehigh Pond 13 Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 29.5% site water, resulting in 3.4 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	29.5% site water
TUc =	<1.0	3.4

Chronic Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 66.7% site water, resulting in 1.5 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	66.7% site water
TUc =	<1.0	1.5

Samples from the Lehigh Permanente Cement Pilot Plant designated ITS Influent and ITS Effluent were also collected on April 13, 15, and 17, 2015. A summary of the results of this testing follows (note: TUc = 100/EC25 or 100/IC25):

Chronic Effects of Lehigh ITS Influent on *Ceriodaphnia dubia*

The survival EC25 was >100% influent, resulting in <1.0 TUc. The reproduction IC25 was 34.3% influent, resulting in 2.9 TUc.

<i>Ceriodaphnia dubia</i>	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% influent	34.3% influent
TUc =	<1.0	2.9

Chronic Effects of Lehigh ITS Effluent on *Ceriodaphnia dubia*

The survival EC25 was >100% effluent, resulting in <1.0 TUc. The reproduction IC25 was 95.3% effluent, resulting in 1.1 TUc.

<i>Ceriodaphnia dubia</i>	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% effluent	95.3% effluent
TUc =	<1.0	1.1

Please note that the NPDES Compliance Summary is attached to this cover letter. If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Alison Briden or myself at (707) 207-7760.

Regards,

Stephen L. Clark
Vice President & Special Projects Director



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 24035.



NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

Testing Facility: Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Lehigh Pond 4A	Chronic Toxicity Test Species:	<i>Ceriodaphnia dubia</i>
	Test Protocol:	EPA-821-R-02-013
	Dilution Series:	6.25, 12.5, 25, 50, 100%
	Test Endpoint:	Survival, Reproduction
Sampling Dates: April 13, 15, and 17, 2015		
Test Dates: April 14-20, 2015		

Current Pond 4A Site Water Test Data.							
Site Water Concentration			% Survival		Mean Reproduction (# neonates /female)		
Hardness Blank			100		23.9*		
Lab Control			100		37.2		
6.25%			100		31.0		
12.5%			100		35.8		
25%			90		28.0		
50%			100		32.1		
100%			100		22.5*		
Current Pond 4A Site Water Test Endpoints.							
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC50-IC50	TUc	TUc Method
Survival	100%	>100%	>100%	>100%	>100%	<1	100/EC25
Reproduction	50%	19.1%	64.2%	>100%	>100%	1.6	100/IC25
Lab Control Survival (after ~96 hrs)				100%			
100% Site Water Survival (after ~96 hrs)				100%			

* The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

Summary of 11 Test Window for <i>Ceriodaphnia dubia</i> : Pond 4A						
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments
1	Mar 25, 27, & 29, 2013	<6.25% (repro)	6.1% (repro)	16.5	10%	
2	May 6, 8, & 10, 2013	<6.25% (repro)	2.9% (repro)	34.7	80%	
3	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%	
4	Mar 10, 12, & 14, 2014	25% (repro)	4.81% (repro)	20.8	0%	
5	Apr 7, 9, & 11, 2014	6.25% (repro)	8.4% (repro)	11.9	0%	
6	Sept 22, 24, & 26, 2014	50% (repro)	>100% (repro)	<1	100%	
7	Nov 10, 12, & 14, 2014	100% (repro)	>100% (repro)	<1	100%	
8	Jan 19, 21, & 23, 2015	25% (repro)	40.1% (repro)	2.5	100%	
9	Apr 13, 15, & 17, 2015	50% (repro)	64.2% (repro)	1.6	100%	
10						
11						



NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

Testing Facility: Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Lehigh Pond 13	Chronic Toxicity Test Species:	<i>Ceriodaphnia dubia</i>
	Test Protocol:	EPA-821-R-02-013
Sampling Dates: April 13, 15, and 17, 2015	Dilution Series:	6.25, 12.5, 25, 50, 100%
Test Dates: April 14-20, 2015	Test Endpoint:	Survival, Reproduction

Current Pond 13 Site Water Test Data.							
Site Water Concentration			% Survival		Mean Reproduction (# neonates /female)		
Hardness Blank			100		23.9*		
Lab Control			100		33.6		
6.25%			100		30.0		
12.5%			100		31.5		
25%			100		26.6		
50%			90		18.0*		
100%			100		19.8*		
Current Pond 13 Site Water Test Endpoints.							
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC50-IC50	TUc	TUc Method
Survival	100%	>100%	>100%	>100%	>100%	<1	100/EC25
Reproduction	25%	19.1%	29.5%	45.9%	>100%	3.4	100/IC25
Lab Control Survival (after ~96 hrs)				100%			
100% Site Water Survival (after ~96 hrs)				100%			

* The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

Summary of 11 Test Window for <i>Ceriodaphnia dubia</i> : Pond 13						
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments
1	Mar 25, 27, & 29, 2013	<6.25% (repro)	3.7% (repro)	27.3	30%	
2	May 6, 8, & 10, 2013	50% (repro)	6.1% (repro)	16.4	100%	
3	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%	
4	Mar 14 & 18, 2014	50% (repro)	48% (repro)	2.1	100%	
5	Dec 8, 10, & 12, 2014	100% (repro)	43.9% (repro)	2.3	100%	
6	Jan 19, 21, & 23, 2015	100% (repro)	>100% (repro)	<1	100%	
7	Apr 13, 15, & 17, 2015	25% (repro)	29.5% (repro)	3.4	100%	
8						
9						
10						
11						



NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

Testing Facility: Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Lehigh Pond 14	Chronic Toxicity Test Species:	<i>Ceriodaphnia dubia</i>
	Test Protocol:	EPA-821-R-02-013
Sampling Dates: April 13, 15, and 17, 2015	Dilution Series:	6.25, 12.5, 25, 50, 100%
Test Dates: April 14-20, 2015	Test Endpoint:	Survival, Reproduction

Current Pond 14 Site Water Test Data.							
Site Water Concentration			% Survival		Mean Reproduction (# neonates /female)		
Hardness Blank			100		23.9*		
Lab Control			100		37.5		
6.25%			90		35.0		
12.5%			100		33.7		
25%			100		37.8		
50%			100		30.7		
100%			100		23.0*		
Current Pond 14 Site Water Test Endpoints.							
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC50-IC50	TUc	TUc Method
Survival	100%	>100%	>100%	>100%	>100%	<1	100/EC25
Reproduction	50%	43.9%	66.7%	>100%	>100%	1.5	100/IC25
Lab Control Survival (after ~96 hrs)				100%			
100% Site Water Survival (after ~96 hrs)				100%			

* The response at this test treatment was significantly less than the Lab Control treatment response (p < 0.05).

Summary of 11 Test Window for <i>Ceriodaphnia dubia</i> : Pond 14						
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments
1	Mar 25, 27, & 29, 2013	25% (repro)	39.6% (repro)	2.5	30%	
2	May 6, 8, & 10, 2013	100%	87.1% (repro)	1.1	100%	
3	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%	
4	Mar 14 & 18, 2014	100% (repro)	>100% (repro)	<1	100%	
5	Apr 7, 9, & 11, 2014	100% (repro)	>100% (repro)	<1	100%	
6	Sept 22, 24, & 26, 2014	100% (repro)	>100% (repro)	<1	100%	
7	Nov 10, 12, & 14, 2014	100% (repro)	>100% (repro)	<1	100%	
8	Jan 19, 21, & 23, 2015	100% (repro)	>100% (repro)	<1	100%	
9	Apr 13, 15, & 17, 2015	50% (repro)	66.7% (repro)	1.5	100%	
10						
11						



Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples

Samples collected April 13, 15, and 17, 2015

Prepared For

Lehigh Southwest Cement Company
24001 Stevens Creek Boulevard
Cupertino, CA 95014

Prepared By

Pacific EcoRisk, Inc.
2250 Cordelia Rd.
Fairfield, CA 94534

May 2015

Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples

Samples collected April 13, 15, and 17, 2015

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- Appendix I Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

1. INTRODUCTION

Under contract to the Lehigh Southwest Cement Company, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity of Lehigh Southwest Cement Company Permanente Facility (Lehigh) water samples from three sites (designated Pond 4A, Pond 13, and Pond 14), and influent (ITS Influent) and effluent (ITS Effluent) from a Pilot Plant. This evaluation consisted of performing the US EPA short-term chronic 3-brood (6-8 day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*. These toxicity tests were conducted on samples collected on April 13, 15, and 17, 2015. In order to assess the sensitivity of the organisms to chemical stress, a reference toxicant test was performed. This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

The method used in conducting the chronic toxicity tests followed the guidance established by the following EPA manual:

- “Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition” (EPA-821-R-02-013).

2.1 Sample Receipt and Handling

On April 13, 15, and 17, five Lehigh water samples (designated Pond 4A, Pond 13, Pond 14, ITS Influent, and ITS Effluent) were collected into appropriately cleaned sample containers. These samples were transported on the day of collection, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each water sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody records for the collection and delivery of the samples are presented in Appendix A.

Table 1. Initial water quality characteristics of the Lehigh site water samples.

Sample ID	Sample Receipt Date	Temp. (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
Pond 4A	4/13/15	4.7	7.61	7.2	192	746	1323	<1.0
	4/15/15	1.2	7.41	6.4	195	747	1351	<1.0
	4/17/15	7.3*	7.84	8.5	173	607	1281	<1.0
Pond 13	4/13/15	3.3	8.23	9.1	191	736	1316	<1.0
	4/15/15	0.4	7.88	8.9	196	740	1345	<1.0
	4/17/15	7.9*	8.32	8.6	187	690	1279	<1.0
Pond 14	4/13/15	3.4	7.90	8.8	192	728	1342	<1.0
	4/15/15	0.6	7.96	8.5	193	728	1353	<1.0
	4/17/15	11.0*	7.97	8.4	204	722	1351	<1.0
ITS Influent	4/13/15	5.4	7.63	9.4	170	748	1333	<1.0
	4/15/15	0.7	7.79	8.9	195	746	1350	<1.0
	4/17/15	8.3*	7.88	8.6	197	704	1332	<1.0
ITS Effluent	4/13/15	13.3*	7.20	3.0	196	742	1331	<1.0
	4/15/15	8.3*	7.34	1.6	208	758	1324	<1.0
	4/17/15	7.3*	7.44	5.0	209	730	1318	<1.0

* This sample was transported and delivered on ice the day of sample collection.

2.2 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *C. dubia* test consists of exposing individual females to a series of sample dilutions for the length of time it takes for the Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this testing are described below.

The Lab Water Control medium for this testing was modified EPA synthetic moderately hard water amended with 5% filtered ambient water from a clean reference site. The Lab Water Control medium and the samples were used to prepare test solutions at test treatment concentrations of 6.25%, 12.5%, 25%, 50%, and 100% sample for each sample. At the request of the client, an additional Hardness Blank (consisting Type 1 water [reverse-osmosis, de-ionized water] amended with reagent-grade chemicals to a nominal hardness of 745 mg/L) was prepared and tested; prior to use, the Hardness Blank was filtered to remove any insoluble particulate material. For each test treatment, the test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food to provide food for the test organisms. “New” water quality characteristics (pH, dissolved oxygen [D.O.], and conductivity) were measured on these food-amended test solutions prior to use in these tests.

There were 10 replicates for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. These “3-brood” tests were initiated by allocating one neonate (<24 hrs old, and within 8 hrs of age) *C. dubia*, obtained from in-house laboratory cultures, into each replicate cup. The test replicate cups were placed into a temperature-controlled room at 25°C, under cool white fluorescent lighting on a 16L:8D photoperiod.

Each day of the tests, fresh test solutions were prepared and characterized as before, and a “new” set of replicate cups was prepared. The original test replicate cups were examined, with surviving “original” individual organisms being transferred to the corresponding new cup. The contents of each of the remaining “old” replicate cups was carefully examined and the number of neonate offspring produced by each original organism was determined, after which the “old” water quality characteristics (pH, D.O., and conductivity) were measured for the old media from one randomly-selected replicate at each treatment.

After it was determined that $\geq 60\%$ of the *C. dubia* in a Lab Water Control treatment had produced their third brood of offspring, the corresponding site water test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairment caused by the samples; all statistical analyses were performed using the CETIS[®] statistical software (TidePool Scientific, McKinleyville, CA).

2.2.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the test organisms to toxic stress, a reference toxicant test was performed concurrently with the site water tests. The reference toxicant test was performed similarly to the site water tests except that test solutions consisted of Lab Water Control medium spiked with NaCl at test concentrations of 500, 1000, 1500, 2000, and 2500 mg/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., EC₅₀); all statistical analyses were made using the CETIS[®] software. These response endpoints were then compared to the ‘typical response’ ranges established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Effects of Lehigh Samples on *Ceriodaphnia dubia*

3.1.1 Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 2. The survival EC₂₅ was >100% site water, resulting in <1.0 survival TUC (where TUC = 100/EC₂₅). The reproduction IC₂₅ was 64.2% site water, resulting in 1.6 reproduction TUC (where TUC = 100/IC₂₅).

The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 2. Effects of Lehigh Pond 4A site water on <i>Ceriodaphnia dubia</i> survival and reproduction.		
Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	100	23.9*
Lab Water Control	100	37.2
6.25%	100	31.0
12.5%	100	35.8
25%	90	28.0
50%	100	32.1
100%	100	22.5*
Summary of Key Statistics		
NOEC =	100% site water	50% site water
TUC (TUC = 100/NOEC) =	1.0	2.0
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% site water ^a	64.2% site water
TUC (TUC = 100/EC ₂₅ or 100/IC ₂₅) =	<1.0	1.6
Survival EC ₅₀ or Reproduction IC ₅₀ =	>100% site water ^a	>100% site water
TUC (TUC = 100/EC ₅₀ or 100/IC ₅₀) =	<1.0	<1.0

* - The response at this test treatment was significantly less than the Lab Control treatment response (p < 0.05).

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

3.1.2 Effects of Lehigh Pond 13 Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. The survival EC₂₅ was >100% site water, resulting in <1.0 survival TUC (where TUC = 100/EC₂₅). The reproduction IC₂₅ was 29.5%, resulting in 3.4 reproduction TUC (where TUC = 100/IC₂₅).

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Effects of Lehigh Pond 13 site water on <i>Ceriodaphnia dubia</i> survival and reproduction.		
Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	100	23.9*
Lab Control	100	33.6
6.25%	100	30.0
12.5%	100	31.5
25%	100	26.6
50%	90	18.0*
100%	100	19.8*
Summary of Key Statistics		
NOEC =	100% site water	25% site water
TUC (TUC = 100/NOEC) =	1.0	4.0
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% site water ^a	29.5% site water
TUC (TUC = 100/EC ₂₅ or 100/IC ₂₅) =	<1.0	3.4
Survival EC ₅₀ or Reproduction IC ₅₀ =	>100% site water ^a	>100% site water
TUC (TUC = 100/EC ₅₀ or 100/IC ₅₀) =	<1.0	<1.0

* - The response at this test treatment was significantly less than the Lab Control treatment response (p < 0.05).

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

3.1.3 Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 4. The survival EC₂₅ was >100% site water, resulting in <1.0 survival TUC (where TUC = 100/EC₂₅). The reproduction IC₂₅ was 66.7%, resulting in 1.5 reproduction TUC (where TUC = 100/IC₂₅).

The test data and summary of statistical analyses for this test, excluding outlier data, are presented in Appendix D; the summary of statistical analyses for this test, including outlier data, are presented in Appendix E.

Table 4. Effects of Lehigh Pond 14 site water on <i>Ceriodaphnia dubia</i> survival and reproduction.		
Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	100	23.9*
Lab Control	100	37.5 ^b
6.25%	90	35.0 ^b
12.5%	100	33.7
25%	100	37.8
50%	100	30.7
100%	100	23.0*
Summary of Key Statistics		
NOEC =	100% site water	50% site water
TUC (TUC = 100/NOEC) =	1.0	2.0
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% site water ^a	66.7% site water
TUC (TUC = 100/EC ₂₅ or 100/IC ₂₅) =	<1.0	1.5
Survival EC ₅₀ or Reproduction IC ₅₀ =	>100% site water ^a	>100% site water
TUC (TUC = 100/EC ₅₀ or 100/IC ₅₀) =	<1.0	<1.0

* - The response at this test treatment was significantly less than the Lab Control treatment response (p < 0.05).

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

b - Statistical analyses indicated that the reproduction response for one of the replicates at this test treatment was a statistical outlier, and the results reported above are for the analyses of the test data excluding this outlier. As per EPA guidelines, the test data were analyzed both with and without the outlier, and the results of both sets of analyses are reported in the appendices.

3.1.4 Effects of Lehigh ITS Influent on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 5. The survival EC₂₅ was >100% influent, resulting in <1.0 survival TUC (where TUC = 100/EC₂₅). The reproduction IC₂₅ was 34.3% influent, resulting in 2.9 reproduction TUC (where TUC = 100/IC₂₅).

The test data and summary of statistical analyses for this test, excluding outlier data, are presented in Appendix F; the summary of statistical analyses for this test, including outlier data, are presented in Appendix G.

Table 5. Effects of Lehigh ITS Influent on <i>Ceriodaphnia dubia</i> survival and reproduction.		
Influent Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	100	23.9*
Lab Control	100	42.1 ^b
6.25%	90	36.4
12.5%	100	38.9
25%	100	37.8* ^b
50%	100	21.2*
100%	100	16.5*
Summary of Key Statistics		
NOEC =	100% influent	12.5% influent
TUC (TUC = 100/NOEC) =	1.0	8.0
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% influent ^a	34.3% influent
TUC (TUC = 100/EC ₂₅ or 100/IC ₂₅) =	<1.0	2.9
Survival EC ₅₀ or Reproduction IC ₅₀ =	>100% influent ^a	51.5% influent
TUC (TUC = 100/EC ₅₀ or 100/IC ₅₀) =	<1.0	1.9

* - The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% influent.

b - Statistical analyses indicated that the reproduction response for one of the replicates at this test treatment was a statistical outlier, and the results reported above are for the analyses of the test data excluding this outlier. As per EPA guidelines, the test data were analyzed both with and without the outlier, and the results of both sets of analyses are reported in the appendices.

3.1.5 Effects of Lehigh ITS Effluent on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 6. The survival EC₂₅ was >100% effluent, resulting in <1.0 survival TUC (where TUC = 100/EC₂₅). The reproduction IC₂₅ was 95.3% effluent, resulting in 1.1 reproduction TUC (where TUC = 100/IC₂₅).

The test data and summary of statistical analyses for this test are presented in Appendix H.

Table 6. Effects of Lehigh ITS Effluent on <i>Ceriodaphnia dubia</i> survival and reproduction.		
Effluent Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	100	23.9*
Lab Control	100	39.7
6.25%	100	41.7
12.5%	100	40.1
25%	100	39.2
50%	100	36.5
100%	100	29.9*
Summary of Key Statistics		
NOEC =	100% effluent	50% effluent
TUC (TUC = 100/NOEC) =	1.0	2.0
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% effluent ^a	95.3% effluent
TUC (TUC = 100/EC ₂₅ or 100/IC ₂₅) =	<1.0	1.1
Survival EC ₅₀ or Reproduction IC ₅₀ =	>100% effluent ^a	>100% effluent
TUC (TUC = 100/EC ₅₀ or 100/IC ₅₀) =	<1.0	<1.0

* - The response at this test treatment was significantly less than the Lab Control treatment response (p < 0.05).

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% effluent.

4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Assessment of concentration response relationship; and
- Positive Control (reference toxicant) testing.

Maintenance of Acceptable Test Conditions

The April 13 and 15 samples of ITS Effluent had D.O. concentrations of 3.0 mg/L and 1.6 mg/L, respectively. Per the EPA method manual, the samples were aerated until D.O. concentrations reached >4 mg/L before use in test solution preparation. All other test conditions (pH, D.O., temperature, etc.) were within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

Negative Control Testing

The responses at the Lab Control treatments were acceptable.

Concentration Response Relationships

There were valid concentration-response relationships for the site water and reference toxicant tests (EPA-821-B-00-004).

Positive Control Testing - Reference Toxicant Toxicity

The results of this test are summarized below in Table 7. The survival EC₅₀ and reproduction IC₅₀ for these tests were consistent with the “typical response” ranges established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxicant stress in a typical and consistent fashion.

The test data and summary of statistical analyses for this test are presented in Appendix I.

Table 7. Reference toxicant testing: effects of NaCl on <i>Ceriodaphnia dubia</i> .		
NaCl Treatment (mg/L)	Mean % Survival	Mean Reproduction (# neonates/female)
Lab Control	100	34.8
500	100	34.6
1000	100	30.4
1500	80	18.3*
2000	60	6.7*
2500	0*	-
Summary of Statistics		
Survival EC ₅₀ or Reproduction IC ₅₀ =	1900 mg/L NaCl	1540 mg/L NaCl
“Typical Response” =	1706 - 2273 mg/L NaCl	1339 - 1687 mg/L NaCl

* The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

5. SUMMARY AND CONCLUSIONS

Chronic Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 64.2% site water, resulting in 1.6 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	64.2% site water
TUc =	<1.0	1.6

Chronic Effects of Lehigh Pond 13 Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 29.5% site water, resulting in 3.4 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	29.5% site water
TUc =	<1.0	3.4

Chronic Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*

The survival EC25 was >100% site water, resulting in <1.0 TUc. The reproduction IC25 was 66.7% site water, resulting in 1.5 TUc.

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% site water	66.7% site water
TUc =	<1.0	1.5

Chronic Effects of Lehigh ITS Influent on *Ceriodaphnia dubia*

The survival EC25 was >100% influent, resulting in <1.0 TUc. The reproduction IC25 was 34.3% influent, resulting in 2.9 TUc.

<i>Ceriodaphnia dubia</i>	Survival	Reproduction
Survival EC25 or Reproduction IC25 =	>100% influent	34.3% influent
TUc =	<1.0	2.9

Chronic Effects of Lehigh ITS Effluent on *Ceriodaphnia dubia*

The survival EC₂₅ was >100% effluent, resulting in <1.0 TU_c. The reproduction IC₂₅ was 95.3% effluent, resulting in 1.1 TU_c.

<i>Ceriodaphnia dubia</i>	Survival	Reproduction
Survival EC ₂₅ or Reproduction IC ₂₅ =	>100% effluent	95.3% effluent
TU _c =	<1.0	1.1

Appendix A

Chain-of-Custody Records for the Collection and Delivery of the Lehigh Samples



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To: Robertson-Bryan, Inc		Invoice To: Lehigh Southwest Cement Co.		REQUESTED ANALYSIS														
Address: 9888 Kent Street Elk Grove, CA 95624		Address: P.O. Box 660140 Dallas, TX 75266		Ceriodaphnia dubia Survival and Reproduction, EPA 1002.0														
Phone: (916) 405-8918		Phone: 925-244-6570																
Attn: Paul Bedore		Attn: Greg Knapp																
E-mail: paul@robertson-bryan.com		E-mail: greg.knapp@hanson.biz																
Project Name: Lehigh Southwest Cement - Permanente Creek																		
P.O.#/Ref:																		
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/Comp	Container		x											
					Number	Type												
1 Pond 4A	4/13/15	9:30	FW	Comp	1	2.5-gal LDPE Cube	x											
2 Pond 13		8:45	FW	Grab	1	2.5-gal LDPE Cube	x											
3 Pond 14		8:02	FW	Grab	1	2.5-gal LDPE Cube	x											
4 ITS Influent		9:10	FW	Comp	1	2.5-gal LDPE Cube	x											
5 ITS Effluent		9:40	FW	Comp	1	2.5-gal LDPE Cube	x											
6																		
7																		
8																		
9																		
10																		

Samples collected by: P Bedore / B Giudice				
Comments/Special Instruction: Initiation Sample Concurrent reference toxicant test	RELIQUISHED BY:		RECEIVED BY:	
	Signature: Paul Bedore		Signature: [Signature]	
	Print: PAUL BEDORE		Print: NICK BUKEMPER WB	
	Organization: RRI		Organization: PER	
	Date: 4/13/15	Time: 11:40	Date: 4/13/15 Time: 11:40	
	RELIQUISHED BY:		RECEIVED BY:	
	Signature:		Signature:	
	Print:		Print:	
Organization:		Organization:		
Date:		Time:	Date:	Time:

*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To: Robertson-Bryan, Inc		Invoice To: Lehigh Southwest Cement Co.		REQUESTED ANALYSIS														
Address: 9888 Kent Street Elk Grove, CA 95624		Address: P.O. Box 660140 Dallas, TX 75266		Ceriodaphnia dubia Survival and Reproduction, EPA 1002.0														
Phone: (916) 405-8918		Phone: 925-244-6570																
Attn: Paul Bedore		Attn: Greg Knapp																
E-mail: paul@robertson-bryan.com		E-mail: greg.knapp@hanson.biz																
Project Name: Lehigh Southwest Cement - Permanente Creek																		
P.O.#/Ref:																		
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/Comp	Container		x											
					Number	Type												
1 Pond 4A	4-15-15	9:55	FW	Comp	1	2.5-gal LDPE Cube	x											
2 Pond 13		9:05	FW	Grab	1	2.5-gal LDPE Cube	x											
3 Pond 14		8:16	FW	Grab	1	2.5-gal LDPE Cube	x											
4 ITS Influent		9:25	FW	Comp	1	2.5-gal LDPE Cube	x											
5 ITS Effluent		9:43	FW	Comp	1	2.5-gal LDPE Cube	x											
6																		
7																		
8																		
9																		
10																		

Samples collected by: P Bedore / B Giudice	
Comments/Special Instruction: Renewal Sample Concurrent reference toxicant test No tubing	RELIQUINSHED BY:
	Signature: Paul Bedore
	Print: PAUL BEDORE
	Organization: PER
	Date: 4/15/15 Time: 11:00
	RELIQUINSHED BY:
	Signature:
	Print:
	Organization:
	Date: Time:
RECEIVED BY:	
Signature: Al Webster	
Print: Alan Webster	
Organization: PER	
Date: 4/15/15 Time: 12:10	
RECEIVED BY:	
Signature:	
Print:	
Organization:	
Date: Time:	

*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To: Robertson-Bryan, Inc		Invoice To: Lehigh Southwest Cement Co.		REQUESTED ANALYSIS											
Address: 9888 Kent Street		Address: P.O. Box 660140		Ceriodaphnia dubia Survival and Reproduction, EPA 1002.0											
Elk Grove, CA 95624		Dallas, TX 75266													
Phone: (916) 405-8918		Phone: 925-244-6570													
Attn: Paul Bedore		Attn: Greg Knapp													
E-mail: paul@robertson-bryan.com		E-mail: greg.knapp@hanson.biz													
Project Name: Lehigh Southwest Cement - Permanente Creek															
P.O.#/Ref:															
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/Comp	Container										
					Number	Type									
1 Pond 4A	4-17-15	9:17	FW	Comp	1	2.5-gal LDPE Cube	x								
2 Pond 13		8:05	FW	Grab	1	2.5-gal LDPE Cube	x								
3 Pond 14		7:30	FW	Grab	1	2.5-gal LDPE Cube	x								
4 ITS Influent		8:50	FW	Comp	1	2.5-gal LDPE Cube	x								
5 ITS Effluent		9:10	FW	Comp	1	2.5-gal LDPE Cube	x								
6															
7															
8															
9															
10															
Samples collected by: P Bedore / B Giudice															
Comments/Special Instruction: Renewal Sample Concurrent reference toxicant test							RELIQUINSHED BY:				RECEIVED BY:				
							Signature: <i>B Giudice</i>				Signature: <i>L Connolly</i>				
							Print: <i>Ben Giudice</i>				Print: <i>Laura Connolly</i>				
							Organization: <i>PER</i>				Organization: <i>PER</i>				
							Date: <i>4-17-15</i>		Time: <i>11:40</i>		Date: <i>4/17/15</i>		Time: <i>11:40</i>		
							RELIQUINSHED BY:				RECEIVED BY:				
							Signature:				Signature:				
							Print:				Print:				
							Organization:				Organization:				
							Date:		Time:		Date:		Time:		

*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 4A Site Water to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 11 May-15 14:57 (p 1 of 2)
Test Code: 62227 | 02-5504-6273

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	07-3943-5730	Test Type:	Reproduction-Survival (7d)				Analyst:	Drew Gantner			
Start Date:	14 Apr-15 15:30	Protocol:	EPA-821-R-02-013 (2002)				Diluent:	Laboratory Water			
Ending Date:	20 Apr-15 15:50	Species:	Ceriodaphnia dubia				Brine:	Not Applicable			
Duration:	6d 0h	Source:	In-House Culture				Age:	1			
Sample ID:	21-0870-5968	Code:	Pond 4A				Client:	Lehigh Permanente			
Sample Date:	14 Apr-15 15:30	Material:	Site Water				Project:	24035			
Receive Date:	20 Apr-15 15:50	Source:	Lehigh Permanente								
Sample Age:	NA (4.7 °C)	Station:	Pond 4A								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
03-0661-5517	Reproduction	50	100	70.71	27.4%	2	Bonferroni Adj t Test				
19-5946-0375	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
12-5551-4850	Reproduction	IC5	3.05	1.31	25.3	32.78	Linear Interpolation (ICPIN)				
		IC10	6.1	2.62	56.4	16.39					
		IC15	19.1	3.93	66.9	5.229					
		IC20	51.9	5.24	79.1	1.926					
		IC25	64.2	14.5	91.5	1.557					
		IC40	>100	N/A	N/A	<1					
		IC50	>100	N/A	N/A	<1					
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	37.2	31	43.4	22	46	2.73	8.63	23.2%	0.0%
6.25		10	31	21.8	40.2	6	49	4.07	12.9	41.5%	16.7%
12.5		9	35.8	28.7	42.8	17	43	3.06	9.18	25.6%	3.82%
25		9	28	19.7	36.3	12	42	3.6	10.8	38.5%	24.7%
50		10	32.1	25.9	38.3	18	43	2.72	8.61	26.8%	13.7%
100		10	22.5	18.6	26.4	17	31	1.73	5.46	24.3%	39.5%
Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 24 Apr-15 15:18 (p 2 of 2)
Test Code: 62227 | 02-5504-6273

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	33	39	42	40	46	44	45	38	23	22
6.25		26	34	21	27	45	49	44	32	26	6
12.5		17	36	43	43	39		42	37	41	24
25		17	18	32	31	42	24	41		35	12
50		36	18	38	24	35	43	38	36	34	19
100		17	25	26	26	29	19	31	17	18	17
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	0	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

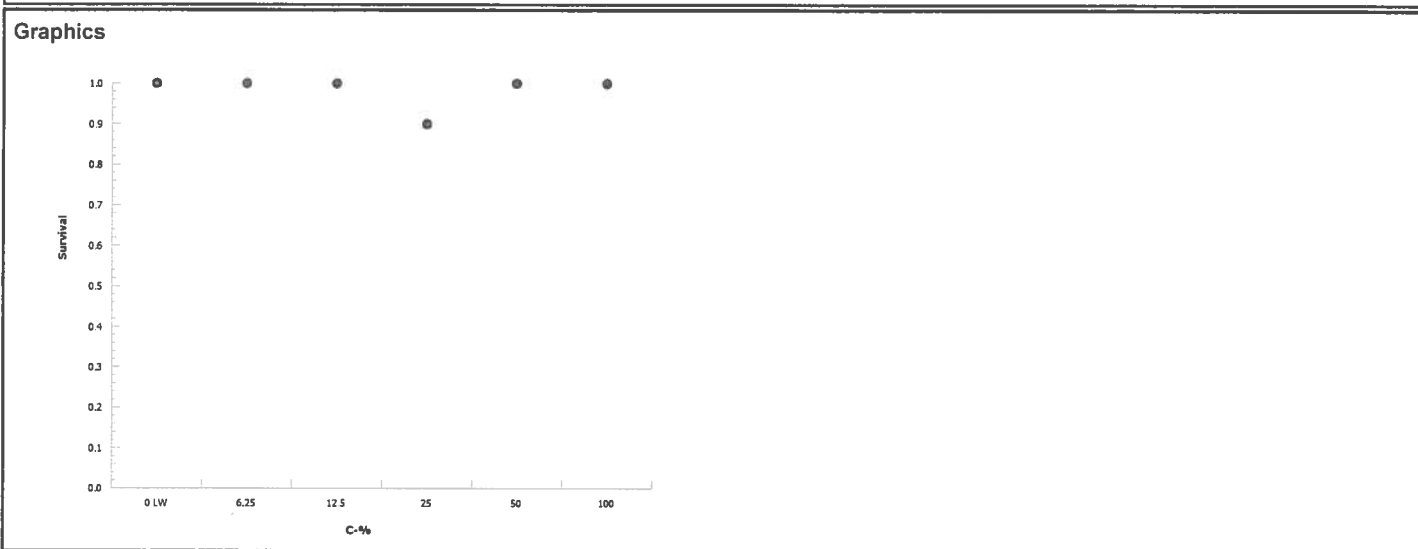
CETIS Analytical Report

Report Date: 24 Apr-15 14:52 (p 1 of 1)
Test Code: 62227 | 02-5504-6273

Ceriodaphnia Survival and Reproduction Test					Pacific EcoRisk			
Analysis ID: 19-5946-0375	Endpoint: Survival		CETIS Version: CETISv1.8.7					
Analyzed: 23 Apr-15 17:57	Analysis: STP 2x2 Contingency Tables		Official Results: Yes					
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test						
Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	1	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	0.5	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary							
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		9	1	10	0.9	0.1	10.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 11 May-15 14:57 (p 1 of 1)

Test Code: 62227 | 02-5504-6273

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 03-0661-5517	Endpoint: Reproduction	CETIS Version: CETISv1.8.7
Analyzed: 11 May-15 14:55	Analysis: Parametric-Multiple Comparison	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	27.4%	50	100	70.71	2

Bonferroni Adj t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	1.46	2.4	10.2	18	0.3770	CDF	Non-Significant Effect
		12.5	0.326	2.4	10.5	17	1.0000	CDF	Non-Significant Effect
		25	2.11	2.4	10.5	17	0.1001	CDF	Non-Significant Effect
		50	1.2	2.4	10.2	18	0.5895	CDF	Non-Significant Effect
		100*	3.46	2.4	10.2	18	0.0027	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value	2.75	3.19	0.2612	No Outliers Detected

ANOVA Table

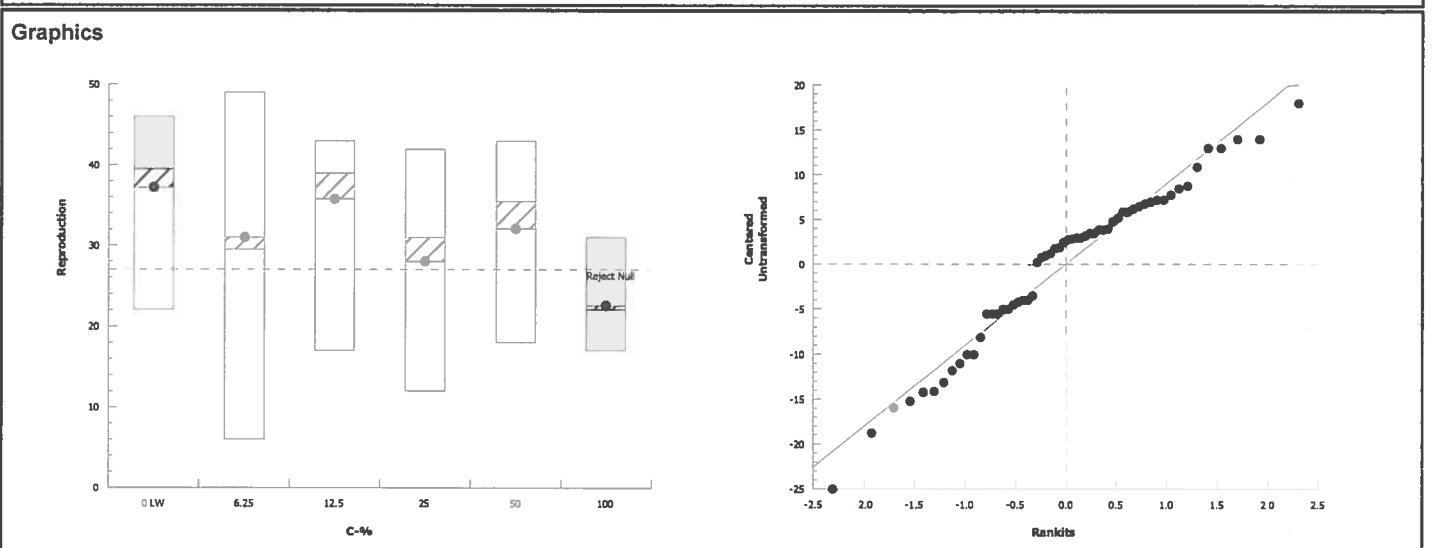
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1405.169	281.0337	5	3.11	0.0157	Significant Effect
Error	4700.556	90.3953	52			
Total	6105.724		57			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.33	15.1	0.2757	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.965	0.944	0.0905	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	37.2	31	43.4	39.5	22	46	2.73	23.2%	0.0%
6.25		10	31	21.8	40.2	29.5	6	49	4.07	41.5%	16.7%
12.5		9	35.8	28.7	42.8	39	17	43	3.06	25.6%	3.82%
25		9	28	19.7	36.3	31	12	42	3.6	38.5%	24.7%
50		10	32.1	25.9	38.3	35.5	18	43	2.72	26.8%	13.7%
100		10	22.5	18.6	26.4	22	17	31	1.73	24.3%	39.5%



CETIS Analytical Report

Report Date: 11 May-15 14:57 (p 1 of 1)
Test Code: 62227 | 02-5504-6273

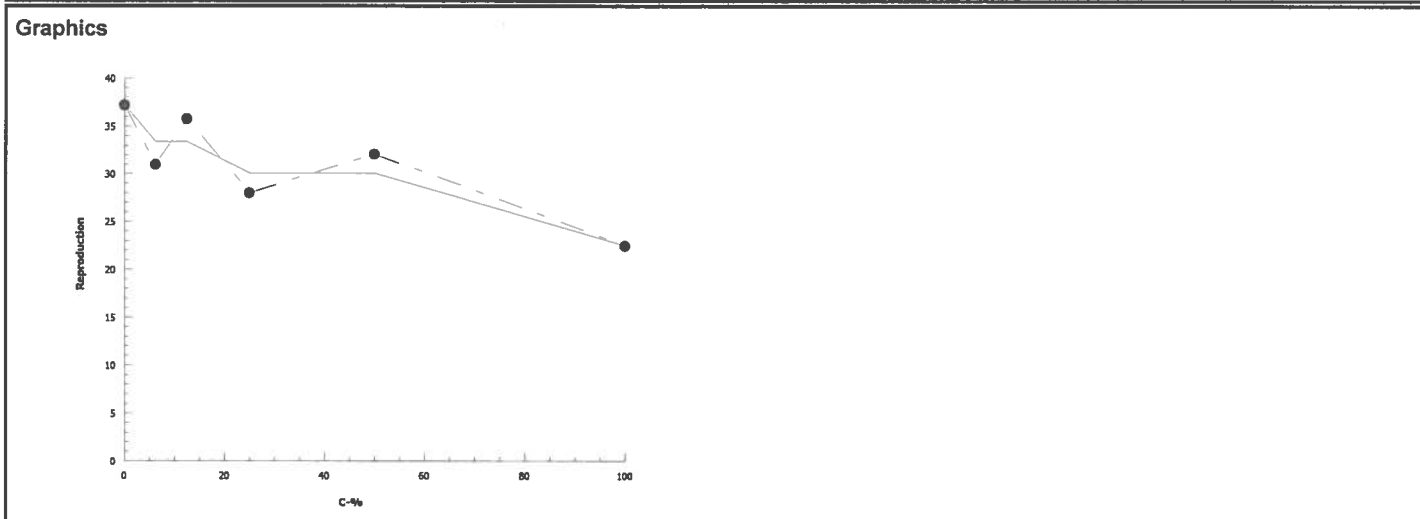
Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk	
Analysis ID:	12-5551-4850	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7
Analyzed:	11 May-15 14:57	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	598193	200	Yes	Two-Point Interpolation

Residual Analysis						
Attribute	Method	Test Stat	Critical	P-Value	Decision(α :5%)	
Extreme Value	Grubbs Extreme Value	2.75	3.19	0.2612	No Outliers Detected	

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.05	1.31	25.3	32.78	3.952	76.37
IC10	6.1	2.62	56.4	16.39	1.775	38.19
IC15	19.1	3.93	66.9	5.229	1.496	25.46
IC20	51.9	5.24	79.1	1.926	1.264	19.09
IC25	64.2	14.5	91.5	1.557	1.092	6.886
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	37.2	22	46	2.73	8.63	23.2%	0.0%
6.25		10	31	6	49	4.07	12.9	41.5%	16.7%
12.5		9	35.8	17	43	3.06	9.18	25.6%	3.82%
25		9	28	12	42	3.6	10.8	38.5%	24.7%
50		10	32.1	18	43	2.72	8.61	26.8%	13.7%
100		10	22.5	17	31	1.73	5.46	24.3%	39.5%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Lehigh Permanente Material: Pond 4A Test Date: 4-14-15
 Project #: 24035 Test ID: 62227 Randomization: 10.7.15 Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init:
Lab Water Control	0	8.14		8.3		315	25.1	0	0	0	0	0	0	0	0	0	0	Date: 4/14/15	New WQ: SVV	Test Init: 1530
	1	7.91	7.94	8.4	8.2	322	25.3	0	0	0	0	0	0	0	0	0	0	Date: 4/15/15	New WQ: SVV	Counts: 43
	2	8.32	7.95	8.5	7.9	318	24.9	0	0	0	0	0	0	0	0	0	0	Date: 4/16/15	New WQ: SVV	Counts: 3V
	3	8.15	8.28	8.6	8.0	319	24.8	0	5	5	7	6	0	0	4	0	0	Date: 4/17/15	New WQ: SE	Counts: 4W5
	4	7.96	7.99	8.2	7.3	318	24.8	4	0	0	0	17	7	7	0	6	8	Date: 4/18/15	New WQ: AFB	Counts: RP
	5	8.08	7.97	8.1	7.6	316	25.2	12	13	14	14	0	15	14	13	16	14	Date: 4/19/15	New WQ: CL	Counts: SM
	6	—	7.80	—	8.2	354	24.8	17	21	23	19	23	22	24	21	1	0	Date: 4/20/15	New WQ: —	Counts: CP
	7																	Date:	New WQ:	Counts:
	8																	Date:	Old WQ:	Time:
Total=								33	39	42	40	46	44	45	38	23	22	Mean Neonates/Female = 37.2		
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										Sample ID		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
6.25%	0	8.03		8.4		396		0	0	0	0	0	0	0	0	0	0	38287		
	1	7.88	7.94	8.2	8.1	409		0	0	0	0	0	0	0	0	0	0	38287		
	2	8.20	7.99	8.5	8.1	401		0	0	0	0	0	0	0	0	0	0	38333		
	3	8.05	8.20	8.6	8.1	392		0	4	0	7	7	8	5	6	0	0	38333		
	4	7.93	7.77	8.3	7.5	387		6	0	7	0	13	0	0	0	9	6	38354		
	5	8.02	8.02	8.5	7.7	390		13	12	14	12	0	15	16	14	17	0	38354		
	6	—	7.72	—	8.1	429		7	18	0	8	25	26	23	12	0	0	—		
	7																			
	8																			
Total=								26	34	21	27	45	49	44	32	26	6	Mean Neonates/Female = 31.0		

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 4ATest Date: 4-14-15Project #: 24035 Test ID: 62227Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
12.5%	0	7.95		8.3		469		0	0	0	0	0	0	0	0	0	0	
	1	7.90	8.00	8.2	8.0	477		0	0	0	0	0	0	0	0	0	0	
	2	8.10	8.02	8.5	8.1	473		0	0	0	0	0	0	0	0	0	0	
	3	7.99	8.20	8.7	8.0	464		0	0	0	0	7	7	6	4	0	0	
	4	7.92	8.03	8.4	6.8	455		3	5	6	7	0	0	0	0	7	9	
	5	7.98	8.06	8.4	7.8	464		12	14	14	16	15	0	14	14	14	15	
	6	-	7.73	-	8.2	556		0	17	23	20	17	0	22	19	20	0	
	7																	
	8																	
	Total=							17	36	43	43	39	7	42	37	41	24	Mean Neonates/Female = 32.9
25%	0	7.87		8.3		599		0	0	0	0	0	0	0	0	0	0	
	1	7.89	8.05	8.2	7.6	609		0	0	0	0	0	0	0	0	0	0	
	2	8.00	8.01	8.5	8.0	605		0	0	0	0	0	0	0	0	0	0	
	3	7.91	8.23	8.7	7.6	589		0	0	4	6	6	6	7	5	0	0	
	4	7.88	7.87	8.5	7.9	578		4	5	0	0	16	0	0	1	6	0	
	5	7.92	8.09	8.4	7.8	586		13	13	14	13	0	18	14	x/0	13	12	
	6	-	7.77	-	8.4	666		0	0	14	12	20	0	20	-	16	0	
	7														-			
	8														-			
	Total=							17	18	32	31	42	24	41	x/6	35	12	Mean Neonates/Female = 25.8

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 4ATest Date: 4-14-15Project #: 24035 Test ID: 62227Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
50%	0	7.79		8.3		856		0	0	0	0	0	0	0	0	0	0	
	1	7.86	8.18	8.2	7.6	870		0	0	0	0	0	0	0	0	0	0	
	2	7.89	8.08	8.4	7.2	857		0	0	0	0	0	0	0	0	0	0	
	3	7.81	8.32	8.7	7.6	834		0	0	7	6	5	5	6	6	5	0	
	4	7.82	7.96	8.7	7.6	812		7	5	0	0	0	0	0	0	0	7	
	5	7.84	8.13	8.6	7.5	826		12	13	15	13	14	16	15	13	14	12	
	6	—	7.90	—	8.2	870		17	0	16	5	16	22	17	17	15	0	
	7																	
	8																	
	Total=							36	18	38	24	35	43	38	36	34	19	Mean Neonates/Female = 32.1
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
100%	0	7.69		8.2		1309		0	0	0	0	0	0	0	0	0	0	
	1	7.86	8.13	8.2	7.1	1330		0	0	0	0	0	0	0	0	0	0	
	2	7.76	8.20	7.9	7.4	1309		0	0	0	0	0	0	0	0	0	0	
	3	7.65	8.39	8.7	6.6	1287		0	2	0	3	5	0	5	0	0	0	
	4	7.73	8.28	8.8	7.6	1233		6	0	0	0	0	7	0	5	6	5	
	5	7.74	8.24	8.9	7.5	1269		11	13	10	11	12	12	13	12	12	12	
	6	—	8.06	—	7.8	1409		0	10	16	12	12	0	13	0	0	0	
	7																	
	8																	
	Total=							17	25	26	26	24	19	31	17	18	17	Mean Neonates/Female = 22.5

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 13 Site Water to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 23 Apr-15 16:33 (p 1 of 2)
Test Code: 62228 | 08-2917-3247

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	01-4991-8293	Test Type:	Reproduction-Survival (7d)			Analyst:	Drew Gantner				
Start Date:	14 Apr-15 13:50	Protocol:	EPA-821-R-02-013 (2002)			Diluent:	Laboratory Water				
Ending Date:	20 Apr-15 14:30	Species:	Ceriodaphnia dubia			Brine:	Not Applicable				
Duration:	6d 1h	Source:	In-House Culture			Age:	1				
Sample ID:	06-9138-8472	Code:	Pond 13			Client:	Lehigh Permanente				
Sample Date:	13 Apr-15 08:45	Material:	Site Water			Project:	24035				
Receive Date:	13 Jan-15 11:40	Source:	Lehigh Permanente								
Sample Age:	29h (3.3 °C)	Station:	Pond 13								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
04-7060-5960	Reproduction	25	50	35.36	31.0%	4	Dunnett Multiple Comparison Test				
12-0478-7312	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
19-0708-9499	Reproduction	IC5	3.68	1.3	27.3	27.14	Linear Interpolation (ICPIN)				
		IC10	14	2.59	30.6	7.124					
		IC15	19.1	3.89	35.1	5.237					
		IC20	24.2	5.18	40.2	4.14					
		IC25	29.5	11.9	48.8	3.385					
		IC40	45.9	22.7	N/A	2.178					
		IC50	>100	N/A	N/A	<1					
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	33.6	27.7	39.5	18	43	2.62	8.29	24.7%	0.0%
6.25		10	30	22.3	37.7	11	44	3.41	10.8	35.9%	10.7%
12.5		10	31.5	25.5	37.5	16	40	2.63	8.33	26.4%	6.25%
25		10	26.6	19	34.2	4	38	3.35	10.6	39.8%	20.8%
50		10	18	9.41	26.6	4	38	3.8	12	66.7%	46.4%
100		10	19.8	12.3	27.3	0	34	3.32	10.5	53.0%	41.1%
Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 23 Apr-15 16:33 (p 2 of 2)
 Test Code: 62228 | 08-2917-3247

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	22	42	43	41	36	36	33	30	35	18
6.25		21	34	22	37	41	44	23	27	40	11
12.5		27	19	36	36	38	40	30	37	16	36
25		22	34	38	27	19	30	35	37	4	20
50		19	11	4	5	38	19	12	24	37	11
100		0	10	28	34	25	29	12	21	14	25
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	0	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

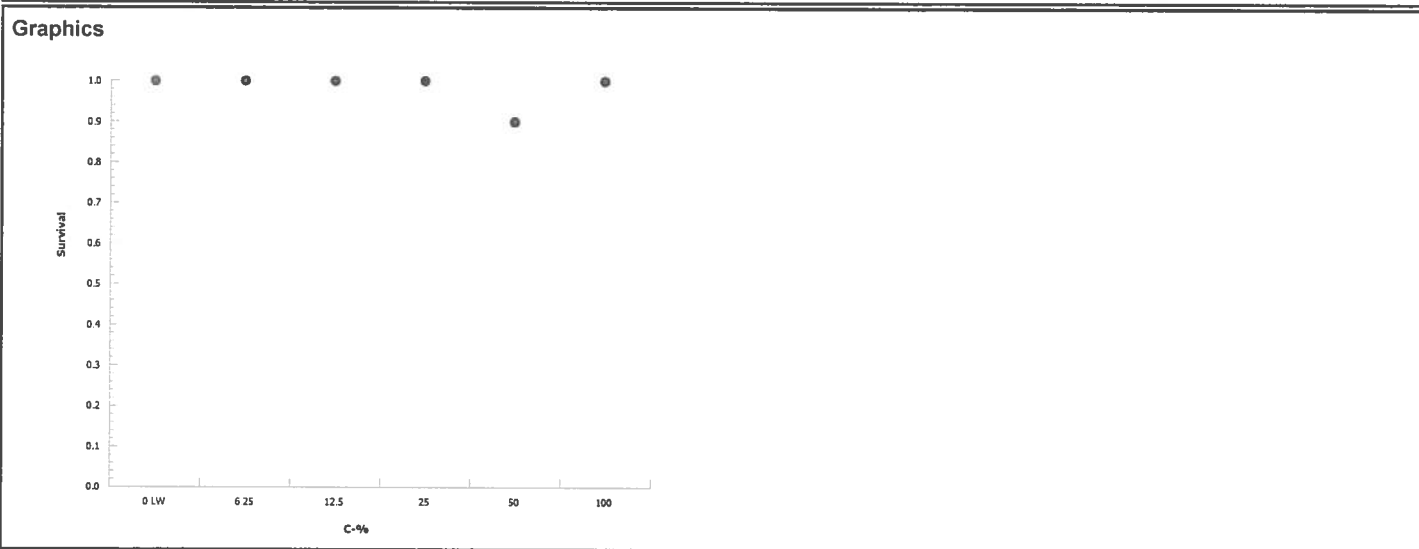
CETIS Analytical Report

Report Date: 23 Apr-15 16:28 (p 1 of 1)
Test Code: 62228 | 08-2917-3247

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk		
Analysis ID:	12-0478-7312	Endpoint:	Survival	CETIS Version:	CETISv1.8.7			
Analyzed:	23 Apr-15 16:26	Analysis:	STP 2x2 Contingency Tables	Official Results:	Yes			
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test						
Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	1	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	0.5	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary							
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		9	1	10	0.9	0.1	10.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 16:28 (p 1 of 1)
Test Code: 62228 | 08-2917-3247

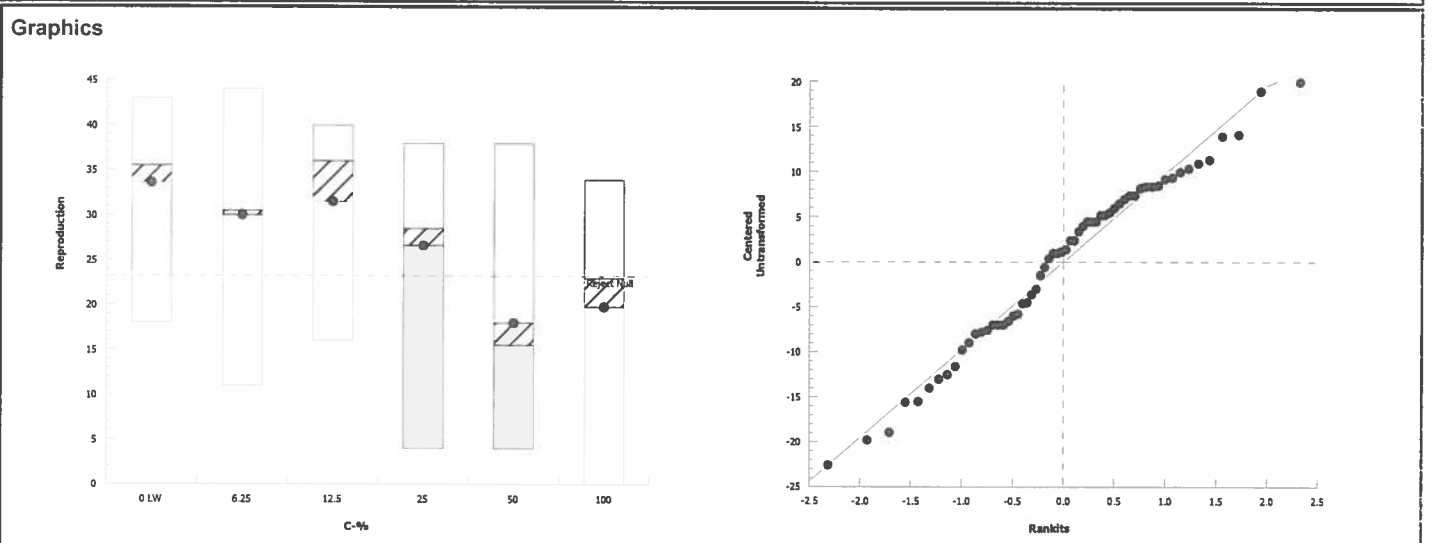
Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk			
Analysis ID:	04-7060-5960	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7				
Analyzed:	23 Apr-15 16:27	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes				
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	31.0%	25	50	35.36	4

Dunnett Multiple Comparison Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.791	2.29	10.4	18	0.5128	CDF	Non-Significant Effect
		12.5	0.462	2.29	10.4	18	0.6626	CDF	Non-Significant Effect
		25	1.54	2.29	10.4	18	0.2046	CDF	Non-Significant Effect
		50*	3.43	2.29	10.4	18	0.0026	CDF	Significant Effect
		100*	3.03	2.29	10.4	18	0.0080	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2047.683	409.5367	5	3.96	0.0039	Significant Effect
Error	5586.9	103.4611	54			
Total	7634.583		59			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.88	15.1	0.8658	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.978	0.946	0.3505	Normal Distribution

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	33.6	27.7	39.5	35.5	18	43	2.62	24.7%	0.0%
6.25		10	30	22.3	37.7	30.5	11	44	3.41	35.9%	10.7%
12.5		10	31.5	25.5	37.5	36	16	40	2.63	26.4%	6.25%
25		10	26.6	19	34.2	28.5	4	38	3.35	39.8%	20.8%
50		10	18	9.41	26.6	15.5	4	38	3.8	66.7%	46.4%
100		10	19.8	12.3	27.3	23	0	34	3.32	53.0%	41.1%



CETIS Analytical Report

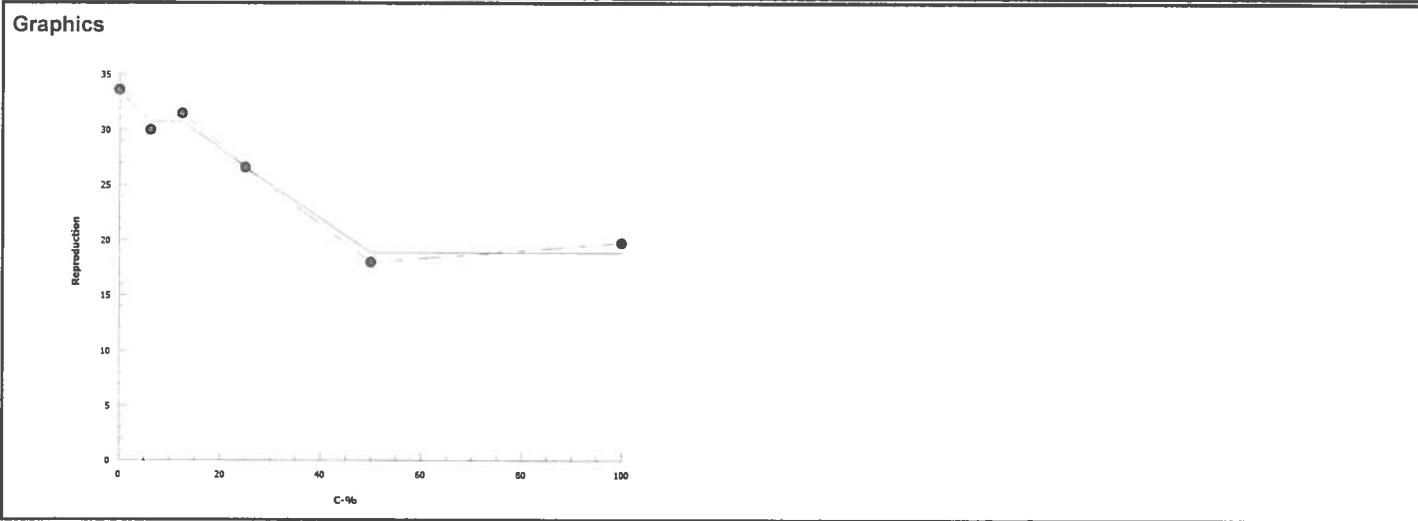
Report Date: 23 Apr-15 16:28 (p 1 of 1)
 Test Code: 62228 | 08-2917-3247

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk	
Analysis ID:	19-0708-9499	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7
Analyzed:	23 Apr-15 16:27	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1553894	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.68	1.3	27.3	27.14	3.662	77.16
IC10	14	2.59	30.6	7.124	3.272	38.58
IC15	19.1	3.89	35.1	5.237	2.85	25.72
IC20	24.2	5.18	40.2	4.14	2.487	19.29
IC25	29.5	11.9	48.8	3.385	2.047	8.416
IC40	45.9	22.7	N/A	2.178	NA	4.396
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	33.6	18	43	2.62	8.29	24.7%	0.0%
6.25		10	30	11	44	3.41	10.8	35.9%	10.7%
12.5		10	31.5	16	40	2.63	8.33	26.4%	6.25%
25		10	26.6	4	38	3.35	10.6	39.8%	20.8%
50		10	18	4	38	3.8	12	66.7%	46.4%
100		10	19.8	0	34	3.32	10.5	53.0%	41.1%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 13Test Date: 4/14/15Project #: 24035 Test ID: 62228Randomization: 10.7.1Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init:
Lab Water Control	0	7.86		8.5		328	25.1	0	0	0	0	0	0	0	0	0	0	4/14/15	New WQ: <u>SVV</u>	Test Init: <u>VJ</u>
	1	8.01	7.96	8.1	8.3	323	25.3	0	0	0	0	0	0	0	0	0	0	4/15/15	New WQ: <u>SVV</u>	Time: <u>1350</u>
	2	8.41	8.11	8.5	8.6	322	25.0	0	0	0	0	0	0	0	0	0	0	4/15/15	New WQ: <u>SVV</u>	Counts: <u>SM</u>
	3	8.04	8.21	8.7	8.7	316	24.9	0	0	0	0	3	3	0	4/15/15	4	0	4/15/15	New WQ: <u>SVV</u>	Time: <u>1530</u>
	4	8.16	7.78	8.5	6.6	317	24.8	8	5	0	6	0	0	6	0	0	6	4/16/15	New WQ: <u>SVV</u>	Counts: <u>APC</u>
	5	8.00	8.05	8.1	7.8	317	25.0	14	15	14	14	15	13	10	14	12	12	4/16/15	New WQ: <u>SVV</u>	Time: <u>1400</u>
	6	—	7.93	—	8.1	342	24.8	0	22	23	21	18	20	17	12	19	0	4/16/15	New WQ: <u>SVV</u>	Counts: <u>CL</u>
	7																	4/16/15	New WQ: <u>SVV</u>	Time: <u>1530</u>
	8																	4/16/15	New WQ: <u>SVV</u>	Counts: <u>APC</u>
Total=								22	42	43	41	36	36	33	30	35	18	Mean Neonates/Female = <u>33.6</u>		
	Day	pH		D.O.		Cond. (μ S/cm)		A	B	C	D	E	F	G	H	I	J	Sample ID		
		New	Old	New	Old															
6.25%	0	7.81		8.4		398		0	0	0	0	0	0	0	0	0	0	38288		
	1	7.98	8.06	8.1	8.2	419		0	0	0	0	0	0	0	0	0	0	38288		
	2	8.30	8.07	8.6	8.5	401		0	0	0	0	0	0	0	0	0	0	38334		
	3	8.08	8.24	8.7	8.2	393		0	0	6	5	0	6	0	4	0	0	38334		
	4	8.05	7.87	8.5	7.0	387		8	7	0	0	6	0	5	0	8	0	38355		
	5	8.04	8.11	8.2	7.9	399		13	13	16	16	14	15	11	12	14	11	38355		
	6	—	7.82	—	8.3	431		0	14	0	16	21	23	7	11	18	0	—		
	7																			
	8																			
Total=								21	34	22	37	41	44	23	27	40	11	Mean Neonates/Female = <u>30.0</u>		

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 13Test Date: 4/14/15Project #: 24035 Test ID: 62228Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
12.5%	0	7.85		8.5		469		0	0	0	0	0	0	0	0	0	0	
	1	8.02	8.08	8.2	8.1	473		0	0	0	0	0	0	0	0	0	0	
	2	8.23	8.09	8.6	8.3	477		0	0	0	0	0	0	0	0	0	0	
	3	8.11	8.26	8.7	8.2	462		0	0	3	4	6	5	4	5	0	0	
	4	8.04	7.96	8.5	7.0	450		8	7	0	0	1	0	0	0	6	6	
	5	8.08	8.15	8.3	7.9	472		10	12	12	13	13	13	11	11	10	13	
	6	—	7.87	—	8.4	515		13	0	21	19	18	22	15	21	0	17	
	7																	
	8																	
Total=								27	19	37	36	38	40	30	37	16	36	Mean Neonates/Female = 31.6
25%	0	7.86		8.6		605		0	0	0	0	0	0	0	0	0	0	
	1	8.11	8.17	8.3	8.2	608		0	0	0	0	0	0	0	0	0	0	
	2	8.16	8.11	8.7	8.4	603		0	0	0	0	0	0	0	0	0	0	
	3	8.14	8.32	8.8	8.3	593		0	0	5	0	5	0	6	0	3	3	
	4	8.04	8.03	8.6	6.8	589		6	6	0	7	0	6	0	7	0	7	
	5	8.11	8.21	8.5	7.4	597		15	14	15	13	14	8	13	12	0	10	
	6	—	7.93	—	8.5	624		1	14	18	7	0	16	16	18	1	0	
	7																	
	8																	
Total=								22	34	38	27	19	30	35	37	4	20	Mean Neonates/Female = 26.6

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 13Test Date: 4/14/15Project #: 24035 Test ID: 62228Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
50%	0	7.92		8.7		860		0	0	0	0	0	0	0	0	0	0	
	1	8.18	8.23	8.5	8.0	862		0	0	0	0	0	0	0	0	0	0	
	2	8.15	8.20	8.7	8.4	857		0	0	0	0	0	0	0	0	0	0	
	3	8.18	8.41	9.1	8.1	846		0	0	0	0	6	0	0	2	0	0	
	4	8.12	8.16	8.7	6.9	826		7	0	1	5	0	5	6	0	7	6	
	5	8.17	8.29	8.6	7.7	839		11	10	4/3	0	10	14	4	10	13	5	
	6	—	8.03	—	8.0	924		1	1	—	0	22	0	2	12	17	0	
	7									—								
	8									—								
Total=								14	11	4/4	5	38	19	12	24	37	11	Mean Neonates/Female = 18.0
100%	0	8.17		8.9		1306		0	0	0	0	0	0	0	0	0	0	
	1	8.30	8.22	9.0	7.6	1387		0	0	0	0	0	0	0	0	0	0	
	2	8.14	8.21	8.9	7.4	1311		0	0	0	0	0	0	0	0	0	0	
	3	8.20	8.34	9.4	6.8	1287		0	0	2	3	0	0	0	0	3	0	
	4	8.18	8.19	9.3	6.2	1248		0	0	0	0	2	7	4	0	0	2	
	5	8.18	8.36	9.2	6.9	1278		0	10	4/3	0	10	14	4	10	13	8	
	6	—	8.18	—	7.8	1376		0	0	14	18	13	8	8	11	0	14	
	7									—								
	8									—								
Total=								0	10	4/3	34	25	29	12	21	14	25	Mean Neonates/Female = 18.8

4/14/15 MA
18
28 4/15
4-24-15

19.8 4/15

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 14 Site Water to *Ceriodaphnia dubia*: Analysis Excludes Outlier Data

CETIS Summary Report

Report Date: 23 Apr-15 17:44 (p 1 of 2)

Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	11-7471-8046	Test Type:	Reproduction-Survival (7d)				Analyst:	Drew Gantner			
Start Date:	14 Apr-15 13:40	Protocol:	EPA-821-R-02-013 (2002)				Diluent:	Laboratory Water			
Ending Date:	20 Apr-15 16:30	Species:	Ceriodaphnia dubia				Brine:	Not Applicable			
Duration:	6d 3h	Source:	In-House Culture				Age:	1			
Sample ID:	00-1195-9236	Code:	Pond 14				Client:	Lehigh Permanente			
Sample Date:	13 Apr-15 08:02	Material:	Site Water				Project:	23483			
Receive Date:	13 Apr-15 11:40	Source:	Lehigh Permanente								
Sample Age:	30h (3.4 °C)	Station:	Pond 14								
Batch Note:	Statistics Exluding outliers										
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
00-5846-5034	Reproduction	50	100	70.71	22.9%	2	Wilcoxon/Bonferroni Adj Test				
18-2519-9861	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
05-5594-2683	Reproduction	IC5	5.86	2.56	42.4	17.07	Linear Interpolation (ICPIN)				
		IC10	34.1	5.12	57.1	2.931					
		IC15	43.9	30.2	67.8	2.279					
		IC20	54.5	37.2	95.5	1.833					
		IC25	66.7	42.5	N/A	1.499					
		IC40	>100	N/A	N/A	<1					
		IC50	>100	N/A	N/A	<1					
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	8	37.5	34.9	40.1	31	41	1.1	3.12	8.31%	0.0%
6.25		9	35	30.2	39.8	24	44	2.1	6.3	18.0%	6.67%
12.5		10	33.7	28.6	38.8	17	41	2.25	7.12	21.1%	10.1%
25		10	37.8	35.3	40.3	32	42	1.12	3.55	9.4%	-0.8%
50		10	30.7	24.8	36.6	13	43	2.6	8.21	26.7%	18.1%
100		10	23	14.3	31.7	0	35	3.85	12.2	52.9%	38.7%
Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	9	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 23 Apr-15 17:44 (p 2 of 2)
 Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr		41	39	31	38	39	38	35	39	
6.25		30	44	40	39	24	38	31		38	31
12.5		28	36	41	33	41	37	38	34	32	17
25		42	38	36	32	42	40	38	33	36	41
50		26	38	26	36	43	30	32	34	13	29
100		24	32	0	20	33	32	35	28	22	4
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	
6.25		1	1	1	1	1	1	1	0	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

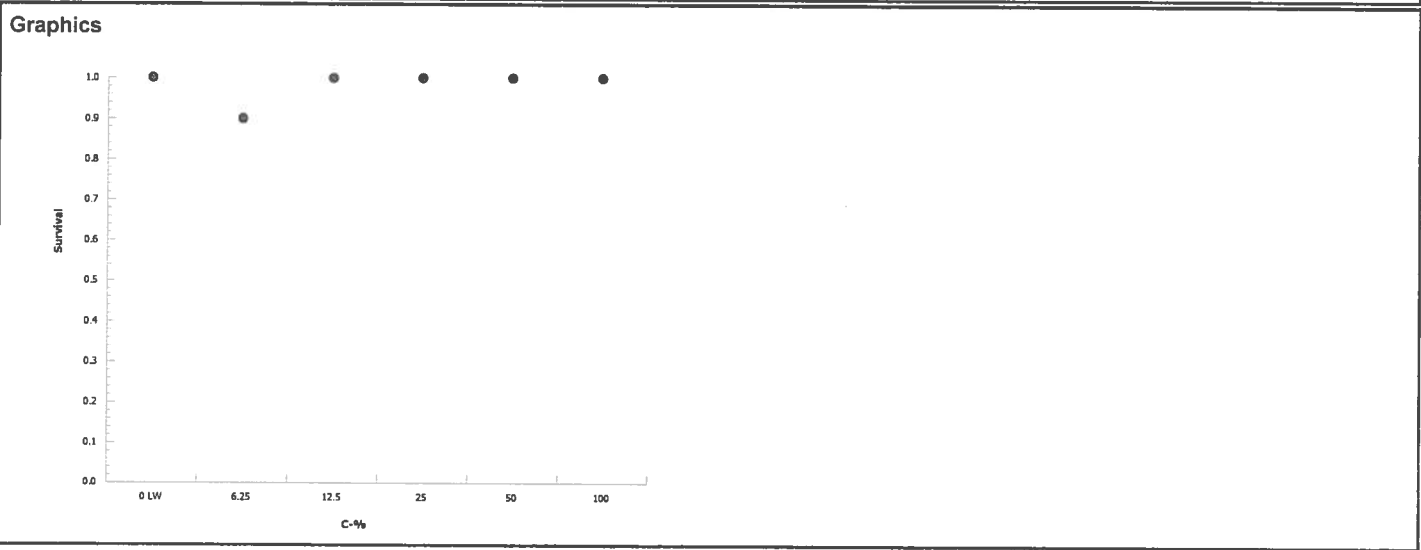
CETIS Analytical Report

Report Date: 23 Apr-15 17:44 (p 1 of 1)
 Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test					Pacific EcoRisk			
Analysis ID:	18-2519-9861	Endpoint:	Survival	CETIS Version:	CETISv1.8.7			
Analyzed:	23 Apr-15 17:44	Analysis:	STP 2x2 Contingency Tables	Official Results:	Yes			
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test						
Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.526	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary							
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	9	0	9	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 17:44 (p 1 of 1)
 Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 00-5846-5034	Endpoint: Reproduction	CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 17:44	Analysis: Nonparametric-Multiple Comparison	Official Results: Yes

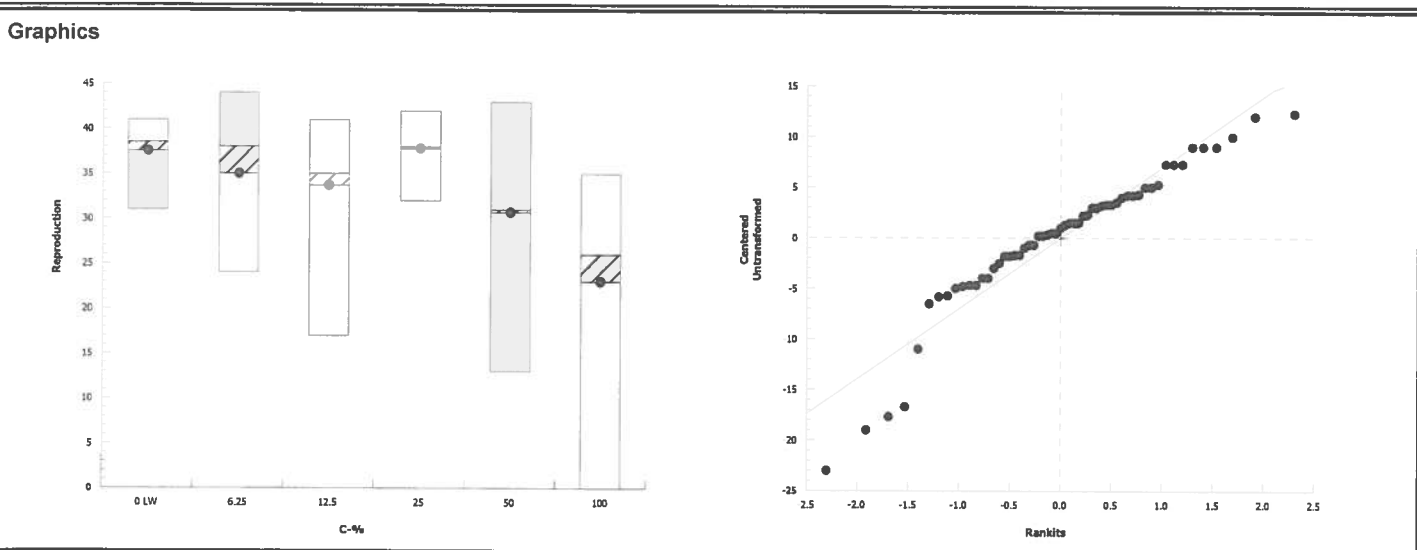
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	22.9%	50	100	70.71	2

Wilcoxon/Bonferroni Adj Test									
Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	72.5	NA	3	15	1.0000	Exact	Non-Significant Effect
		12.5	80	NA	2	16	0.5013	Exact	Non-Significant Effect
		25	97.5	NA	2	16	1.0000	Exact	Non-Significant Effect
		50	70	NA	1	16	0.0624	Exact	Non-Significant Effect
		100*	59.5	NA	1	16	0.0014	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1482.761	296.5523	5	5.23	0.0006	Significant Effect
Error	2893.8	56.74118	51			
Total	4376.562		56			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance	18.7	15.1	0.0022	Unequal Variances	
Distribution	Shapiro-Wilk W Normality	0.916	0.943	0.0007	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	8	37.5	34.9	40.1	38.5	31	41	1.1	8.31%	0.0%
6.25		9	35	30.2	39.8	38	24	44	2.1	18.0%	6.67%
12.5		10	33.7	28.6	38.8	35	17	41	2.25	21.1%	10.1%
25		10	37.8	35.3	40.3	38	32	42	1.12	9.4%	-0.8%
50		10	30.7	24.8	36.6	31	13	43	2.6	26.7%	18.1%
100		10	23	14.3	31.7	26	0	35	3.85	52.9%	38.7%



CETIS Analytical Report

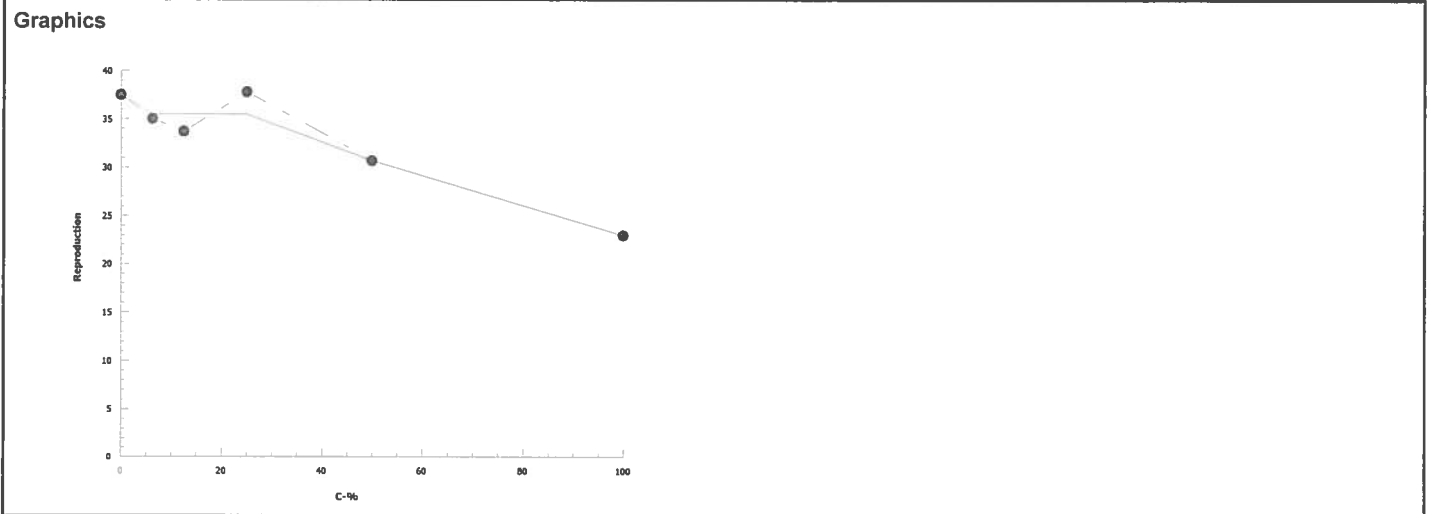
Report Date: 23 Apr-15 17:44 (p 1 of 1)
 Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk
Analysis ID: 05-5594-2683	Endpoint: Reproduction	CETIS Version: CETISv1.8.7		
Analyzed: 23 Apr-15 17:44	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes		

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	259423	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	5.86	2.56	42.4	17.07	2.357	39.09
IC10	34.1	5.12	57.1	2.931	1.752	19.54
IC15	43.9	30.2	67.8	2.279	1.475	3.316
IC20	54.5	37.2	95.5	1.833	1.048	2.685
IC25	66.7	42.5	N/A	1.499	NA	2.355
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	8	37.5	31	41	1.1	3.12	8.31%	0.0%
6.25		9	35	24	44	2.1	6.3	18.0%	6.67%
12.5		10	33.7	17	41	2.25	7.12	21.1%	10.1%
25		10	37.8	32	42	1.12	3.55	9.4%	-0.8%
50		10	30.7	13	43	2.6	8.21	26.7%	18.1%
100		10	23	0	35	3.85	12.2	52.9%	38.7%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 14Test Date: 4/14/15Project #: 24035 Test ID: 62229Randomization: 10.6.11Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp ($^{\circ}$ C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date	New WQ:	Test Init
Lab Water Control	0	7.41		8.9		319	25.1	0	0	0	0	0	0	0	0	0	0	4/14/15	New WQ: <u>SVV</u>	Time <u>1340</u>
	1	7.96	8.08	8.4	8.2	327	25.3	0	0	0	0	0	0	0	0	0	0	4/15/15	New WQ: <u>SVV</u>	Counts <u>1430</u>
	2	8.13	8.09	7.8.3	8.4	320	24.8	0	0	0	0	0	-	0	0	0	0	4/16/15	New WQ: <u>SVV</u>	Counts <u>1415</u>
	3	8.16	8.17	8.6	8.0	313	25.1	0	0	0	0	0	-	3	0	0	0	4/17/15	New WQ: <u>SVV</u>	Counts <u>1509</u>
	4	8.01	8.63	8.3	6.8	321	24.8	6	9	6	6	8	-	0	7	6	6	4/18/15	New WQ: <u>MJM</u>	Counts <u>1530</u>
	5	7.94	8.00	8.5	7.8	320	25.0	13	14	13	11	14	-	15	12	13	14	4/19/15	New WQ: <u>CL</u>	Counts <u>1500</u>
	6	-	8.18	-	8.0	356	24.8	0	18	20	14	16	-	21	19	16	19	4/20/15	New WQ: <u>SVV</u>	Counts <u>1630</u>
	7												-							
	8												-							
Total=								19	41	39	31	38	-	39	38	35	39	Mean Neonates/Female = <u>31.4</u>		
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										Sample ID		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
6.25%	0	7.75		8.6		399		0	0	0	0	0	0	0	0	0	0	38289		
	1	7.96	8.06	8.2	8.3	401		0	0	0	0	0	0	0	0	0	0	38289		
	2	8.06	8.09	8.5	8.2	404		0	0	0	0	0	0	0	0	0	0	38335		
	3	8.08	8.21	8.7	8.2	395		0	0	0	0	0	5	0	x/0	0	0	38335		
	4	7.96	8.06	8.3	7.4	396		3	7	6	7	8	0	0	-	5	3	38356		
	5	7.93	8.05	8.2	7.7	408		13	18	13	14	15	13	13	-	14	11	38356		
	6	-	8.06	-	7.9	459		14	19	21	18	1	20	18	-	19	17	-		
	7														-					
	8														-					
Total=								30	44	40	38	24	38	31	x/0	38	31	Mean Neonates/Female = <u>31.4</u>		

* replicate not loaded - exclude from statistical analysis.

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 14Test Date: 4/14/15Project #: 24035Test ID: 62229Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
12.5%	0	7.80		8.6		476		0	0	0	0	0	0	0	0	0	0	
	1	7.97	8.10	8.3	8.4	476		0	0	0	0	0	0	0	0	0	0	
	2	8.04	8.16	8.6	8.4	477		0	0	0	0	0	0	0	0	0	0	
	3	8.07	8.22	8.7	8.3	470		0	0	0	0	0	4	6	4	0	0	
	4	7.90	8.14	8.3	6.2	473		0	7	4	5	6	0	0	0	5	8	
	5	7.92	8.13	8.1	7.9	476		8	16	15	11	17	14	11	11	12	9	
	6	-	8.10	-	7.9	546		20	13	22	17	18	19	21	19	15	0	
	7																	
	8																	
Total=								28	36	41	33	41	37	38	34	32	17	Mean Neonates/Female = 33.7
25%	0	7.86		8.6		609		0	0	0	0	0	0	0	0	0	0	
	1	8.00	8.17	8.3	8.4	609		0	0	0	0	0	0	0	0	0	0	
	2	7.99	8.23	8.6	8.2	613		0	0	0	0	0	0	0	0	0	0	
	3	8.05	8.29	8.8	8.2	601		0	0	4	0	4	7	6	0	0	5	
	4	7.92	8.21	8.1	7.0	592		8	7	0	6	1	0	0	5	5	0	
	5	7.89	8.18	8.3	8.0	610		14	12	14	13	16	13	14	13	15	16	
	6	-	8.16	-	7.9	686		20	19	18	13	21	20	18	15	16	20	
	7																	
	8																	
Total=								42	38	36	32	42	40	38	33	36	41	Mean Neonates/Female = 37.8

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: Pond 14Test Date: 4/14/15Project #: 24035 Test ID: 62229Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
50%	0	7.87		8.9		867		0	0	0	0	0	0	0	0	0	0	
	1	8.03	8.29	8.4	8.1	855		0	0	0	0	0	0	0	0	0	0	
	2	7.97	8.32	8.6	8.1	871		0	0	0	0	0	0	0	0	0	0	
	3	8.05	8.42	9.1	8.2	854		0	0	0	0	7	0	0	4	0	0	
	4	7.87	8.35	8.2	6.1	859		4	12	5	12	0	5	6	0	6	10	
	5	7.82	8.29	8.5	7.8	868		6	15	4	14	17	10	14	14	7	13	
	6	—	8.19	—	7.8	8973		16	15	17	15	19	15	12	16	0	6	
	7																	
	8																	
Total=								20	38	20	36	43	30	32	34	13	29	Mean Neonates/Female = 30.7
100%	0	7.92		9.2		1341		0	0	0	0	0	0	0	0	0	0	
	1	8.04	8.14	8.5	8.1	1330		0	0	0	0	0	0	0	0	0	0	
	2	7.96	8.28	8.6	8.1	1334		0	0	0	0	0	0	0	0	0	0	
	3	7.99	8.33	9.3	8.2	1309		0	0	0	0	0	5	6	3	0	4	
	4	7.81	8.23	8.6	7.0	1305		6	4	0	6	0	0	6	1	0	0	
	5	7.75	8.18	8.7	8.0	1338		10	11	0	0	12	12	15	8	16	0	
	6	—	8.18	—	7.8	1383		8	17	0	14	21	15	14	16	12	0	
	7																	
	8																	
Total=								24	32	0	20	33	32	35	28	22	4	Mean Neonates/Female = 23.0

Appendix E

Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 14 Site Water to *Ceriodaphnia* *dubia*: Analysis Includes Outlier Data

CETIS Summary Report

Report Date: 23 Apr-15 17:36 (p 1 of 2)
Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	11-7471-8046	Test Type:	Reproduction-Survival (7d)				Analyst:	Drew Gantner			
Start Date:	14 Apr-15 13:40	Protocol:	EPA-821-R-02-013 (2002)				Diluent:	Laboratory Water			
Ending Date:	20 Apr-15 16:30	Species:	Ceriodaphnia dubia				Brine:	Not Applicable			
Duration:	6d 3h	Source:	In-House Culture				Age:	1			
Sample ID:	00-1195-9236	Code:	Pond 14				Client:	Lehigh Permanente			
Sample Date:	13 Apr-15 08:02	Material:	Site Water				Project:	23483			
Receive Date:	13 Apr-15 11:40	Source:	Lehigh Permanente								
Sample Age:	30h (3.4 °C)	Station:	Pond 14								
Batch Note:	Statistics including outliers										
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
03-7466-8809	Reproduction	50	100	70.71	28.0%	2	Wilcoxon/Bonferroni Adj Test				
04-9891-8550	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
19-8032-7448	Reproduction	IC5	29.5	2.14	56	3.384	Linear Interpolation (ICPIN)				
		IC10	41.7	4.29	66.8	2.396					
		IC15	53.7	26.2	N/A	1.862					
		IC20	65.2	37.7	N/A	1.533					
		IC25	76.7	43.3	N/A	1.303					
		IC40	>100	N/A	N/A	<1					
		IC50	>100	N/A	N/A	<1					
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	9	35.4	30.2	40.7	19	41	2.27	6.82	19.2%	0.0%
6.25		10	31.5	22.5	40.5	0	44	3.97	12.6	39.9%	11.1%
12.5		10	33.7	28.6	38.8	17	41	2.25	7.12	21.1%	4.92%
25		10	37.8	35.3	40.3	32	42	1.12	3.55	9.4%	-6.65%
50		10	30.7	24.8	36.6	13	43	2.6	8.21	26.7%	13.4%
100		10	23	14.3	31.7	0	35	3.85	12.2	52.9%	35.1%
Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	9	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date:

23 Apr-15 17:36 (p 2 of 2)

Test Code:

62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	19	41	39	31	38	39	38	35	39	
6.25		30	44	40	39	24	38	31	0	38	31
12.5		28	36	41	33	41	37	38	34	32	17
25		42	38	36	32	42	40	38	33	36	41
50		26	38	26	36	43	30	32	34	13	29
100		24	32	0	20	33	32	35	28	22	4
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	
6.25		1	1	1	1	1	1	1	0	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 23 Apr-15 17:38 (p 1 of 1)
 Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 04-9891-8550	Endpoint: Survival	CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 17:35	Analysis: STP 2x2 Contingency Tables	Official Results: Yes

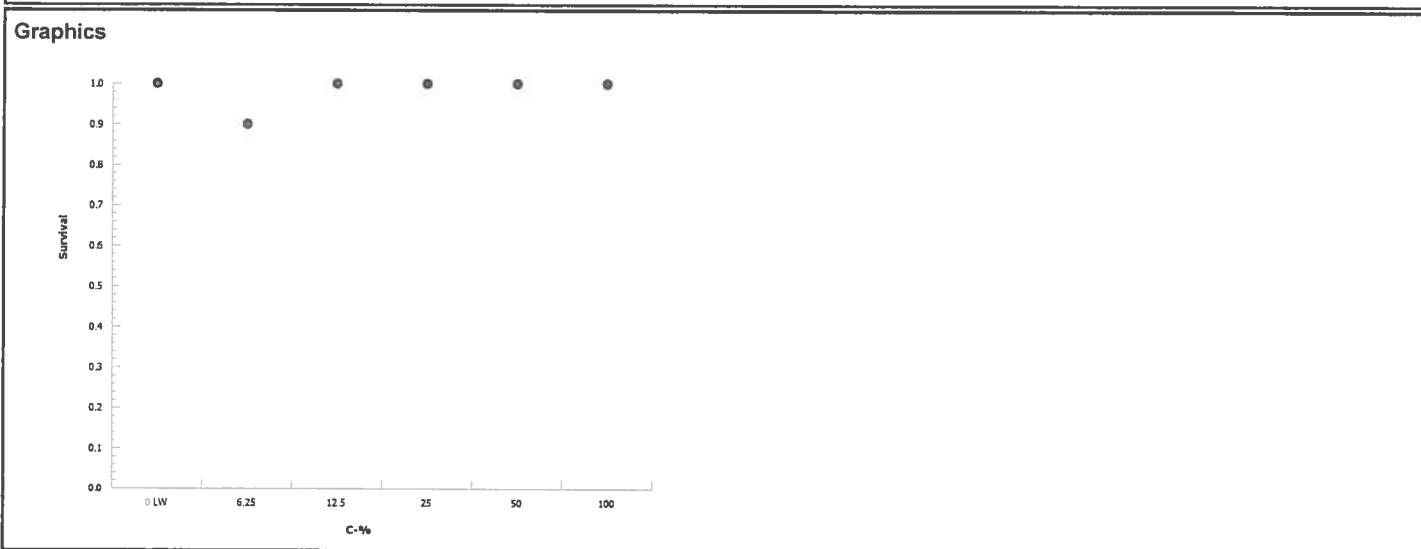
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.526	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	9	0	9	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 17:38 (p 1 of 1)
Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test					Pacific EcoRisk
Analysis ID:	03-7466-8809	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7
Analyzed:	23 Apr-15 17:35	Analysis:	Nonparametric-Multiple Comparison	Official Results:	Yes

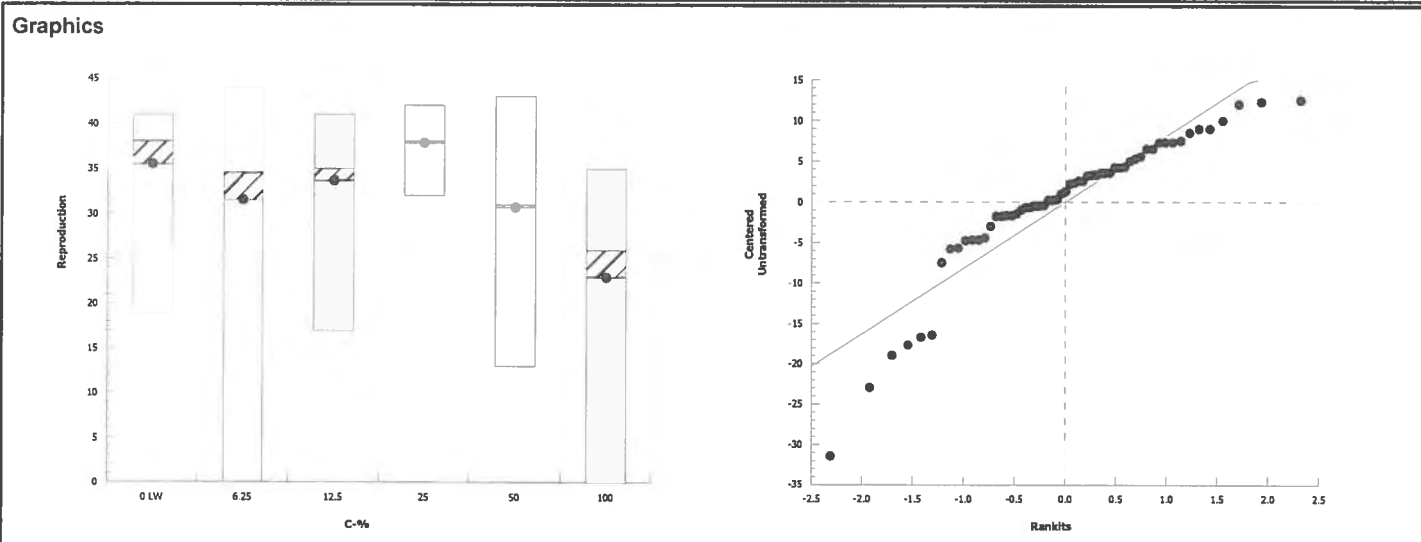
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	28.0%	50	100	70.71	2

Wilcoxon/Bonferroni Adj Test									
Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	91.5	NA	3	17	1.0000	Exact	Non-Significant Effect
		12.5	89	NA	2	17	0.9936	Exact	Non-Significant Effect
		25	108	NA	2	17	1.0000	Exact	Non-Significant Effect
		50	79	NA	1	17	0.2237	Exact	Non-Significant Effect
		100*	67.5	NA	1	17	0.0151	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1301.41	260.282	5	3.21	0.0133	Significant Effect
Error	4300.522	81.14193	53			
Total	5601.933		58			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance	15	15.1	0.0102	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.873	0.945	<0.0001	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	9	35.4	30.2	40.7	38	19	41	2.27	19.2%	0.0%
6.25		10	31.5	22.5	40.5	34.5	0	44	3.97	39.9%	11.1%
12.5		10	33.7	28.6	38.8	35	17	41	2.25	21.1%	4.92%
25		10	37.8	35.3	40.3	38	32	42	1.12	9.4%	-6.65%
50		10	30.7	24.8	36.6	31	13	43	2.6	26.7%	13.4%
100		10	23	14.3	31.7	26	0	35	3.85	52.9%	35.1%



CETIS Analytical Report

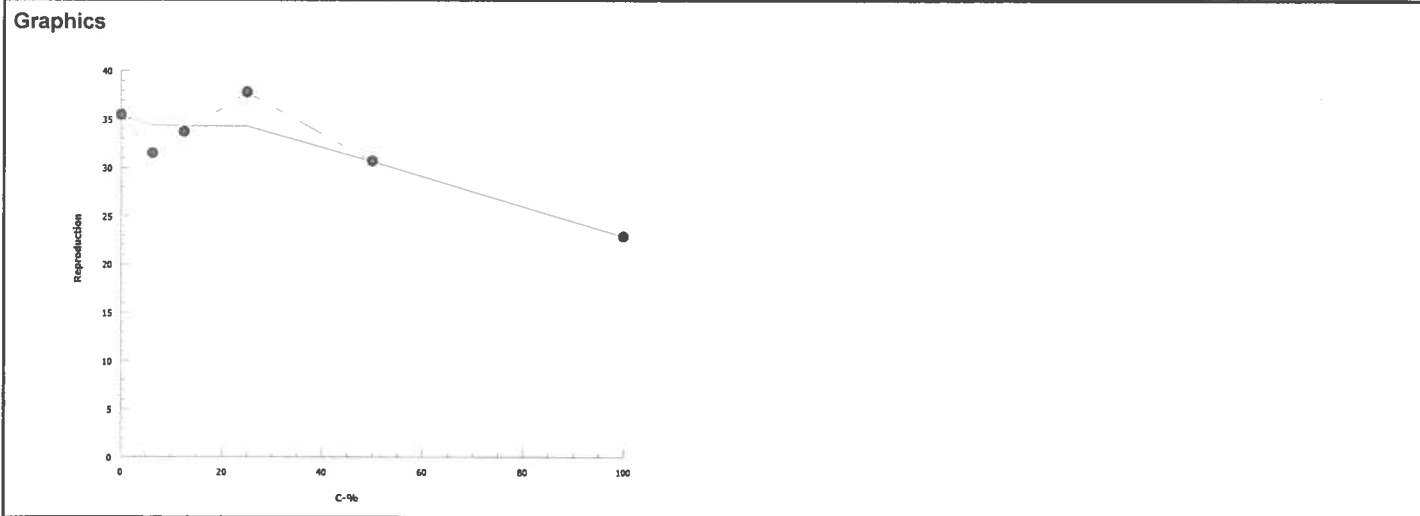
Report Date: 23 Apr-15 17:38 (p 1 of 1)
Test Code: 62229 | 12-3850-9715

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk
Analysis ID: 19-8032-7448	Endpoint: Reproduction	CETIS Version: CETISv1.8.7		
Analyzed: 23 Apr-15 17:35	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes		

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	171060	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	29.5	2.14	56	3.384	1.784	46.63
IC10	41.7	4.29	66.8	2.396	1.498	23.32
IC15	53.7	26.2	N/A	1.862	NA	3.816
IC20	65.2	37.7	N/A	1.533	NA	2.652
IC25	76.7	43.3	N/A	1.303	NA	2.311
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	9	35.4	19	41	2.27	6.82	19.2%	0.0%
6.25		10	31.5	0	44	3.97	12.6	39.9%	11.1%
12.5		10	33.7	17	41	2.25	7.12	21.1%	4.92%
25		10	37.8	32	42	1.12	3.55	9.4%	-6.65%
50		10	30.7	13	43	2.6	8.21	26.7%	13.4%
100		10	23	0	35	3.85	12.2	52.9%	35.1%



Appendix F

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh ITS Influent to *Ceriodaphnia* *dubia*: Analysis Excludes Outlier Data

CETIS Summary Report

Report Date: 24 Apr-15 17:08 (p 1 of 2)

Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test										Pacific EcoRisk	
Batch ID:	08-0377-9275		Test Type:		Reproduction-Survival (7d)			Analyst:	Drew Gantner		
Start Date:	14 Apr-15 14:30		Protocol:		EPA-821-R-02-013 (2002)			Diluent:	Laboratory Water		
Ending Date:	20 Apr-15 16:00		Species:		Ceriodaphnia dubia			Brine:	Not Applicable		
Duration:	6d 2h		Source:		In-House Culture			Age:	1		
Sample ID:	04-1198-4406		Code:		ITS Influent			Client:	Lehigh Permanente		
Sample Date:	13 Apr-15 09:10		Material:		Influent			Project:	23483		
Receive Date:	13 Apr-15 11:40		Source:		Lehigh Permanente						
Sample Age:	29h (5.4 °C)		Station:		ITS Influent						
Batch Note: Statistics Excluding outliers											
Comparison Summary											
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
08-1326-0289	Reproduction		12.5	25	17.68	17.7%	8	Wilcoxon/Bonferroni Adj Test			
03-6731-6746	Survival		100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test			
Point Estimate Summary											
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Method			
16-9255-6840	Reproduction		IC5	2.98	1.69	25.1	33.58	Linear Interpolation (ICPIN)			
			IC10	5.96	3.39	28.1	16.79				
			IC15	27.9	5.08	31.1	3.587				
			IC20	31.1	25.4	34.3	3.219				
			IC25	34.3	29.4	38	2.919				
			IC40	43.8	40.1	48.8	2.281				
			IC50	51.5	46	79	1.94				
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Hardness Blank	10	23.9	19.9	27.9	12	32	1.77	5.59	23.4%	0.0%
0	Lab Water Contr	9	42.1	39.2	45	36	47	1.25	3.76	8.92%	-76.2%
6.25		10	36.4	27.8	45	13	48	3.8	12	33.0%	-52.3%
12.5		10	38.9	33.8	44	22	47	2.23	7.06	18.2%	-62.8%
25		9	37.8	35.6	40	33	42	0.954	2.86	7.58%	-58.1%
50		10	21.2	17.6	24.8	14	28	1.6	5.07	23.9%	11.3%
100		10	16.5	12.9	20.1	10	26	1.57	4.97	30.1%	31.0%
Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Hardness Blank	10	1	1	1	1	1	0	0	0.0%	0.0%
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 24 Apr-15 17:08 (p 2 of 2)
 Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	12	30	28	24	22	32	24	24	23	20
0	Lab Water Contr		43	47	45	41	42	46	42	36	37
6.25		23	37	46	43	25	13	48	48	40	41
12.5		22	42	39	41	45	44	37	47	36	36
25			37	35	38	33	42	39	41	39	36
50		15	20	19	25	28	21	17	27	26	14
100		15	17	10	10	13	18	22	17	26	17
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	1	1	1	1	1	1	1	1	1	1
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	0	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 23 Apr-15 17:18 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 03-6731-6746 Endpoint: Survival CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 17:18 Analysis: STP 2x2 Contingency Tables Official Results: Yes

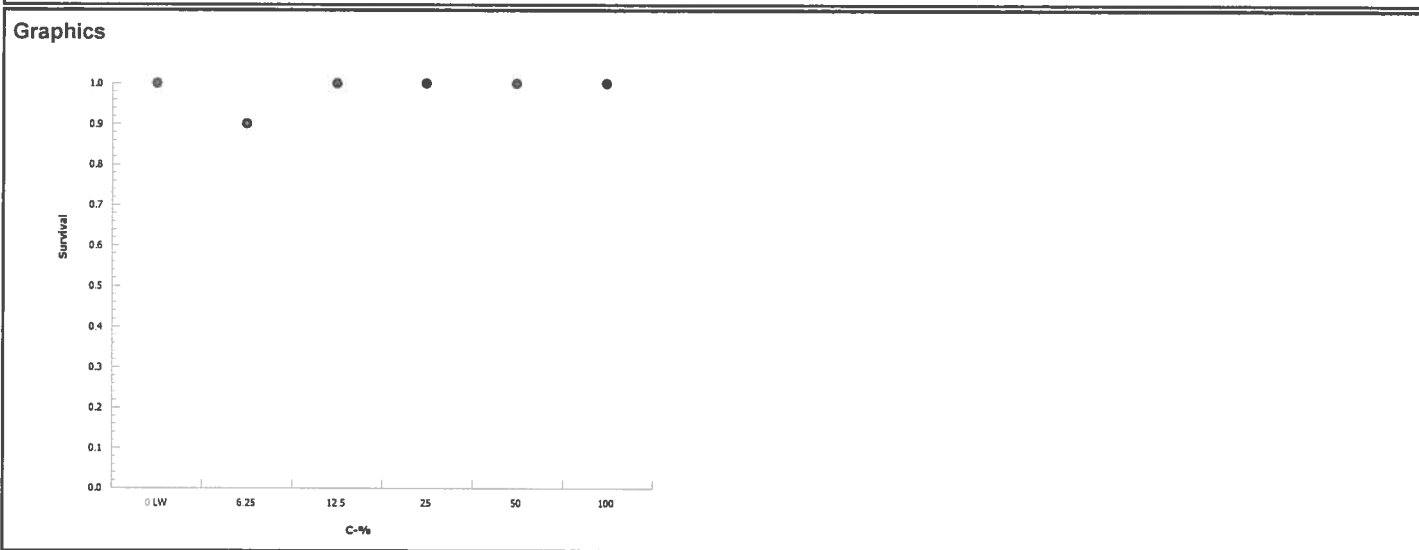
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.5	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 17:18 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 08-1326-0289 Endpoint: Reproduction CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 17:18 Analysis: Nonparametric-Multiple Comparison Official Results: Yes

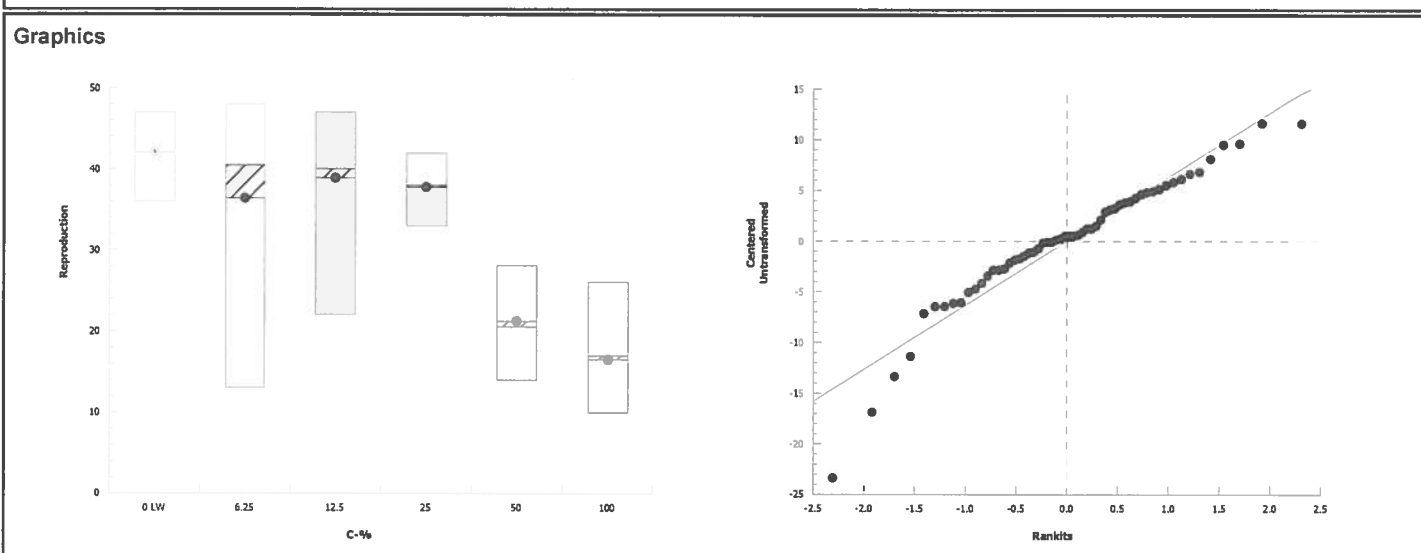
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	17.7%	12.5	25	17.68	8

Wilcoxon/Bonferroni Adj Test									
Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	92	NA	4	17	1.0000	Exact	Non-Significant Effect
		12.5	87	NA	6	17	0.7562	Exact	Non-Significant Effect
		25*	59.5	NA	4	16	0.0500	Exact	Significant Effect
		50*	55	NA	0	17	<0.0001	Exact	Significant Effect
		100*	55	NA	0	17	<0.0001	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5458.311	1091.662	5	23.9	<0.0001	Significant Effect
Error	2377.844	45.72778	52			
Total	7836.155		57			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance	21.8	15.1	0.0006	Unequal Variances	
Distribution	Shapiro-Wilk W Normality	0.937	0.944	0.0049	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	9	42.1	39.2	45	42	36	47	1.25	8.92%	0.0%
6.25		10	36.4	27.8	45	40.5	13	48	3.8	33.0%	13.6%
12.5		10	38.9	33.8	44	40	22	47	2.23	18.2%	7.63%
25		9	37.8	35.6	40	38	33	42	0.954	7.58%	10.3%
50		10	21.2	17.6	24.8	20.5	14	28	1.6	23.9%	49.7%
100		10	16.5	12.9	20.1	17	10	26	1.57	30.1%	60.8%



CETIS Analytical Report

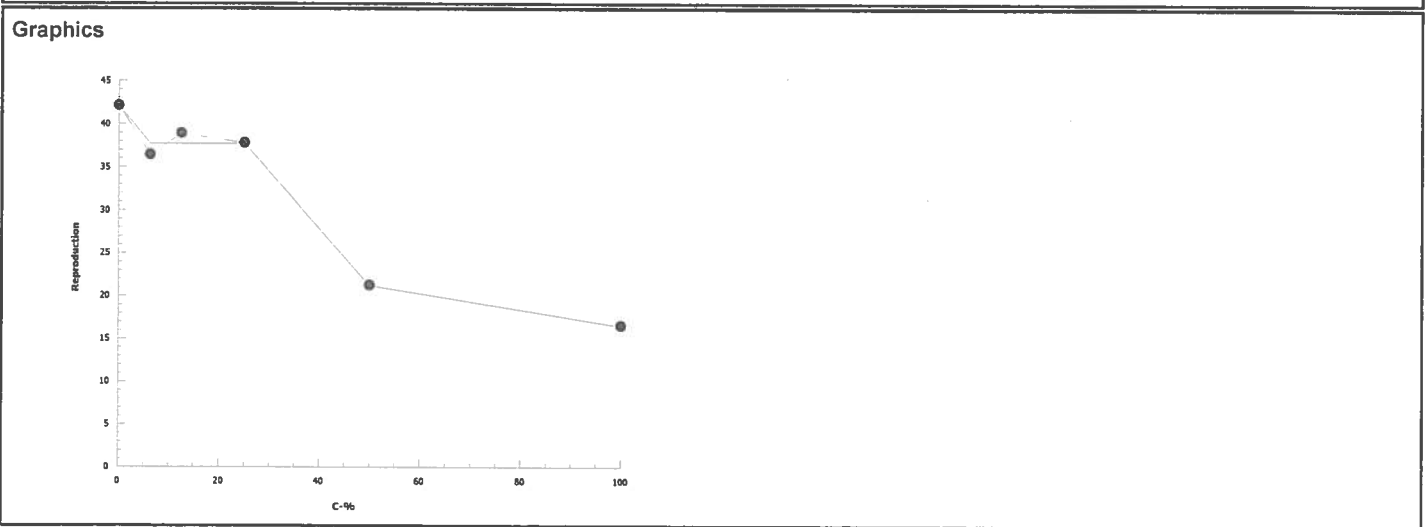
Report Date: 23 Apr-15 17:18 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk
Analysis ID: 16-9255-6840	Endpoint: Reproduction	CETIS Version: CETISv1.8.7		
Analyzed: 23 Apr-15 17:18	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes		

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1063393	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.98	1.69	25.1	33.58	3.987	59.07
IC10	5.96	3.39	28.1	16.79	3.555	29.54
IC15	27.9	5.08	31.1	3.587	3.214	19.69
IC20	31.1	25.4	34.3	3.219	2.916	3.943
IC25	34.3	29.4	38	2.919	2.635	3.404
IC40	43.8	40.1	48.8	2.281	2.048	2.497
IC50	51.5	46	79	1.94	1.266	2.173

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	9	42.1	36	47	1.25	3.76	8.92%	0.0%
6.25		10	36.4	13	48	3.8	12	33.0%	13.6%
12.5		10	38.9	22	47	2.23	7.06	18.2%	7.63%
25		9	37.8	33	42	0.954	2.86	7.58%	10.3%
50		10	21.2	14	28	1.6	5.07	23.9%	49.7%
100		10	16.5	10	26	1.57	4.97	30.1%	60.8%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Lehigh Permanente Material: ITS Influent Test Date: 4/14/15
 Project #: 24035 Test ID: 62230 Randomization: 10.6.13/10.2.1 Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp ($^{\circ}$ C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
Lab Water Control	0	8.10		8.6		314	25.1	0	0	0	0	0	0	0	0	0	0	Date: 4/14/15 New WQ: SVV Test Init: YJ Sol'n Prep: SVV Time: 1430		
	1	8.00	8.06	8.1	8.3	324	25.3	0	0	0	0	0	0	0	0	0	0	Date: 4/15/15 New WQ: SVV Counts: 43 Sol'n Prep: YJ Old WQ: SVV Time: 1520		
	2	8.26	8.10	8.7	8.4	318	25.0	0	0	0	0	0	0	0	0	0	0	Date: 4/16/15 New WQ: SVV Counts: APR Sol'n Prep: ME Old WQ: SVV Time: 1425		
	3	8.04	8.14	8.7	7.8	322	24.7	0	0	7	8	8	7	7	6	6	5	Date: 4/17/15 New WQ: SE Counts: CD Sol'n Prep: Z Old WQ: NB Time: 1730		
	4	8.04	7.85	8.3	6.7	322	24.8	6	8	0	0	0	0	0	0	0	0	Date: 4/18/15 New WQ: MTM Counts: VP Sol'n Prep: ME Old WQ: AU Time: 1615		
	5	8.19	7.97	7.9	8.0	338	25.0	13	12	16	14	12	13	15	14	12	13	Date: 4/19/15 New WQ: MTM Counts: MTM Sol'n Prep: ME Old WQ: CP Time: 1710		
	6	—	8.04	—	7.7	343	24.9	0	23	24	23	21	22	24	22	18	19	Date: 4/20/15 New WQ: — Counts: SM Sol'n Prep: — Old WQ: SVV Time: 1600		
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:		
	8																	Date: Old WQ: Counts: Time:		
Total=							19	43	47	45	41	42	46	42	36	37	Mean Neonates/Female = 39.8			
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										Sample ID		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
6.25%	0	8.05		8.6		390		0	0	0	0	0	0	0	0	0	0	38290		
	1	7.98	8.02	8.1	8.3	415		0	0	0	0	0	0	0	0	0	0	38290		
	2	8.15	8.08	8.7	8.5	400		0	0	0	0	0	0	0	0	0	0	38336		
	3	8.10	8.20	8.8	8.1	422		0	0	0	0	0	7	8	9	5	7	38336		
	4	7.98	7.88	8.0	7.8	396		8	6	0	0	4	4	0	14	0	0	38357		
	5	8.07	8.09	8.0	7.5	399		15	12	17	15	8	—	16	16	0	14	38357		
	6	—	8.18 8.09 4/20/15	—	7.8	414		0	19	23	22	13	—	24	23	21	20	—		
	7												—	—						
	8												—	—						
Total=							23	37	46	43	25	13	48	45	40	41	Mean Neonates/Female = 36.4			

SM 48
4/20/15

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: ITS InfluentTest Date: 4/14/15Project #: 24035Test ID: 62230Control Water: Modified EPAMH

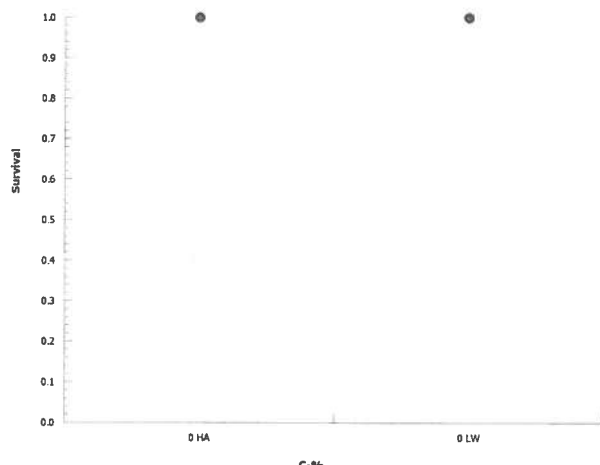
	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
12.5%	0	8.04		8.8		461		0	0	0	0	0	0	0	0	0	0	
	1	7.95	8.09	8.2	8.4	477		0	0	0	0	0	0	0	0	0	0	
	2	8.07	8.13	8.7	8.6	473		0	0	0	0	0	0	0	0	0	0	
	3	8.04	8.23	8.9	8.2	466		0	0	7	5	7	6	5	7	5	6	
	4	7.94	7.92	8.2	8.0	465		7	7	0	0	0	0	0	0	0	0	
	5	8.02	8.17	8.1	7.6	471		15	16	14	15	16	16	14	17	12	12	
	6	—	8.14	—	8.0	507		0	19	18	21	22	22	18	23	19	18	
	7																	
	8																	
Total=								22	42	39	41	45	44	37	47	36	36	Mean Neonates/Female = 38.9
25%	0	8.00		8.9		594		0	0	0	0	0	0	0	0	0	0	
	1	7.93	8.16	8.3	8.4	620		0	0	0	0	0	0	0	0	0	0	
	2	7.99	8.16	8.8	8.5	607		0	0	0	0	0	0	0	0	0	0	
	3	7.98	8.36	9.0	8.4	592		0	0	6	7	5	7	7	7	5	5	
	4	7.88	7.92	8.4	8.2	599		7	6	0	0	0	0	0	0	0	0	
	5	7.99	8.26	8.1	7.8	610		13	13	12	13	11	16	15	14	15	13	
	6	—	8.19	—	7.9	632		0	18	17	18	17	19	17	20	19	18	
	7																	
	8																	
Total=								20	37	35	38	33	42	39	41	39	36	Mean Neonates/Female = 36.0

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: ITS InfluentTest Date: 4/14/15Project #: 24035 Test ID: 62230Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
50%	0	8.03		9.0		847		0	0	0	0	0	0	0	0	0	0	
	1	7.93	8.27	8.5	8.4	861		0	0	0	0	0	0	0	0	0	0	
	2	7.92	8.26	8.8	8.5	859		0	0	0	0	0	0	0	0	0	0	
	3	7.89	8.39	9.3	8.4	846		0	0	6	6	7	8	6	6	6	6	
	4	7.84	8.10	8.7	8.2	836		6	6	0	0	0	0	0	0	0	0	
	5	7.94	8.38	8.5	8.1	853		9	9	10	12	12	13	11	9	10	8	
	6	—	8.29	—	8.1	880		0	5	3	7	9	0	0	12	10	0	
	7																	
	8																	
Total=								15	20	19	25	28	21	17	27	26	14	Mean Neonates/Female = 21.2
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
100%	0	7.93		9.2		1295		0	0	0	0	0	0	0	0	0	0	
	1	7.95	8.21	9.0	8.4	1321		0	0	0	0	0	0	0	0	0	0	
	2	7.86	8.27	8.8	8.5	1302		0	0	0	0	0	0	0	0	0	0	
	3	7.76	8.40	9.9	8.5	1286		0	0	5	4	5	7	6	7	6	6	
	4	7.80	8.09	9.4	8.3	1278		6	6	0	0	0	0	0	0	0	0	
	5	7.90	8.27	9.0	8.1	1297		9	11	5	6	8	11	12	10	9	11	
	6	—	8.19	—	8.3	1305		0	0	0	0	0	0	4	0	11	0	
	7																	
	8																	
Total=								15	17	10	10	13	18	22	17	26	17	Mean Neonates/Female = 16.5

CETIS Analytical Report

Report Date: 24 Apr-15 17:06 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk	
Analysis ID: 10-1550-2479		Endpoint: Survival		CETIS Version: CETISv1.8.7			
Analyzed: 24 Apr-15 16:55		Analysis: Single 2x2 Contingency Table		Official Results: Yes			
Data Transform		Zeta	Alt Hyp	Trials	Seed	Test Result	
Untransformed			C > T	NA	NA	Passes survival	
Fisher Exact Test							
Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)	
Lab Water Control		Hardness Blank	1	1.0000	Exact	Non-Significant Effect	
Data Summary							
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Hardness Blank	10	0	10	1	0	0.0%
0	Lab Water Cont	10	0	10	1	0	0.0%
Graphics							
							

CETIS Analytical Report

Report Date: 24 Apr-15 17:06 (p 1 of 1)

Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk
Analysis ID: 00-3170-1734	Endpoint: Reproduction		CETIS Version: CETISv1.8.7			
Analyzed: 24 Apr-15 16:55	Analysis: Nonparametric-Two Sample		Official Results: Yes			

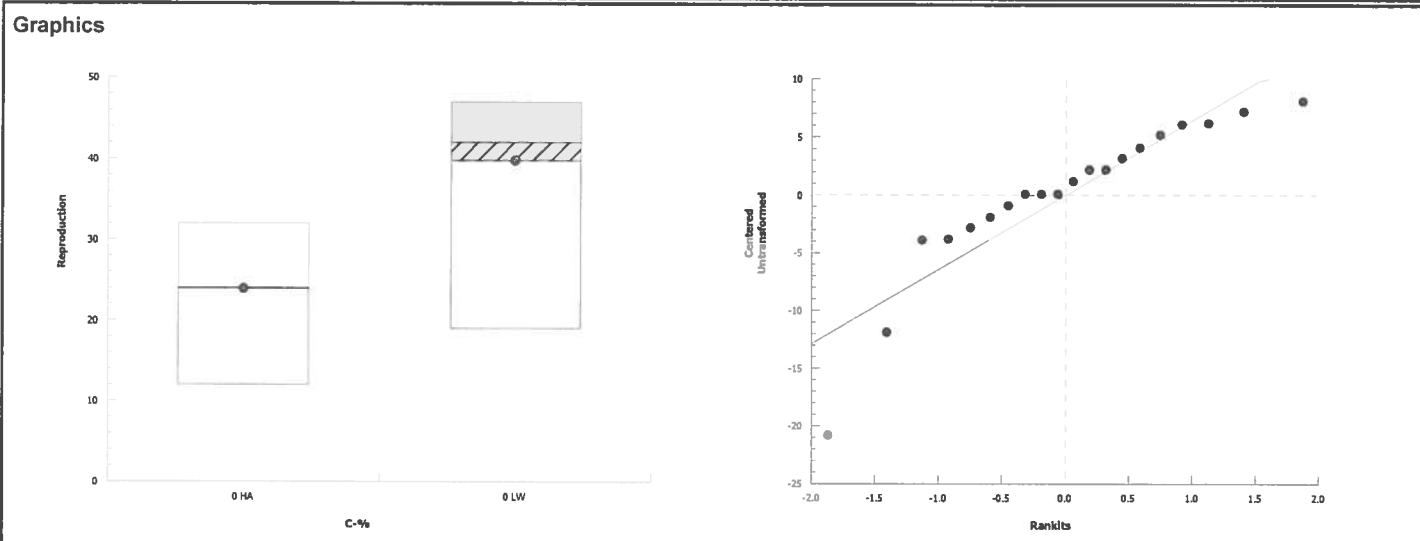
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	Fails reproduction

Wilcoxon Rank Sum Two-Sample Test									
Control	vs	Control	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Hardness Blank	64	NA	0	18	0.0005	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1264.05	1264.05	1	26	<0.0001	Significant Effect
Error	874.5	48.58333	18			
Total	2138.55		19			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	2.11	6.54	0.2803	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.852	0.866	0.0057	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	39.8	34	45.6	42	19	47	2.57	20.4%	0.0%
0	Hardness Blank	10	23.9	19.9	27.9	24	12	32	1.77	23.4%	39.9%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data
 Client: Lehigh Permanente
 Project #: 24035 Test ID: 62230

 Material: Hardness Blank
 Randomization: 10.6.13/10.2.1

 Test Date: 4/14/15
 Control Water: Mod EPA MH 15% Am River

	Day	pH		D.O.		Cond. (μ S/cm)	Temp ($^{\circ}$ C)	Survival / Reproduction										SIGN-OFF	
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J		
Hardness Blank	0	8.09		8.4		1628	25.1	0	0	0	0	0	0	0	0	0	0	Date: 4/14/15 New WQ: SVV Test init.: 43 Sol'n Prep: SVV APF Time: 1430	
	1	8.12	8.12	9.0	8.3	1699	25.3	0	0	0	0	0	0	0	0	0	0	Date: 4/15/15 New WQ: SVV Counts: 43 Sol'n Prep: YJ Old WQ: SVV Time: 1520	
	2	7.91	8.08	9.7	8.3	1677	25.0	0	0	0	0	0	0	0	0	0	0	Date: 4/16/15 New WQ: SVV Counts: APF Sol'n Prep: MF Old WQ: SVV Time: 1428	
	3	8.07	8.12	11.0	8.2	1643	24.7	0	0	8	6	4	7	7	6	6	5	Date: 4/17/15 New WQ: SE Counts: 00 Sol'n Prep: Z Old WQ: MB Time: 1730	
	4	8.04	8.13	10.3	8.2	1674	24.8	5	6	0	0	0	0	0	0	0	0	Date: 4-18-15 New WQ: MSJM Counts: 80 Sol'n Prep: SVV Old WQ: AN Time: 1615	
	5	8.06	8.16	9.1	7.7	1679	25.0	7	8	6	10	6	8	4	6	4	6	Date: 4/19/15 New WQ: MSJM Counts: MFA Sol'n Prep: MF Old WQ: CP Time: 1710	
	6	—	8.10	—	7.7	1732	24.9	0	16	14	8	12	17	13	12	13	9	Date: 4/20/15 New WQ: — Counts: SM Sol'n Prep: — Old WQ: SVV Time: 1600	
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
	8																	Date: Old WQ: Counts: Time:	
	Total=							12	30	28	24	22	32	24	24	23	28	Mean Neonates/Female = 239	

Appendix G

Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh ITS Influent to *Ceriodaphnia dubia*: Analysis Includes Outlier Data

CETIS Summary Report

Report Date: 24 Apr-15 16:56 (p 1 of 2)
 Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Batch ID: 08-0377-9275	Test Type: Reproduction-Survival (7d)	Analyst: Drew Gantner
Start Date: 14 Apr-15 14:30	Protocol: EPA-821-R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 20 Apr-15 16:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 6d 2h	Source: In-House Culture	Age: 1

Sample ID: 04-1198-4406	Code: ITS Influent	Client: Lehigh Permanente
Sample Date: 13 Apr-15 09:10	Material: Influent	Project: 23483
Receive Date: 13 Apr-15 11:40	Source: Lehigh Permanente	
Sample Age: 29h (5.4 °C)	Station: ITS Influent	

Batch Note: Statistics Including outliers

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-7567-6941	Reproduction	25	50	35.36	19.6%	4	Steel Many-One Rank Sum Test
05-6322-6353	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
04-5104-7926	Reproduction	IC5	5.78	1.65	27.9	17.29	Linear Interpolation (ICPIN)
		IC10	25.3	3.31	30.7	3.952	
		IC15	28.7	4.96	33.7	3.489	
		IC20	32	20.4	37.3	3.122	
		IC25	35.4	26.9	40.8	2.826	
		IC40	45.5	39.7	58.7	2.199	
		IC50	63.8	45.9	94.5	1.567	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Hardness Blank	10	23.9	19.9	27.9	12	32	1.77	5.59	23.4%	0.0%
0	Lab Water Contr	10	39.8	34	45.6	19	47	2.57	8.12	20.4%	-66.5%
6.25		10	36.4	27.8	45	13	48	3.8	12	33.0%	-52.3%
12.5		10	38.9	33.8	44	22	47	2.23	7.06	18.2%	-62.8%
25		10	36	31.5	40.5	20	42	1.97	6.24	17.3%	-50.6%
50		10	21.2	17.6	24.8	14	28	1.6	5.07	23.9%	11.3%
100		10	16.5	12.9	20.1	10	26	1.57	4.97	30.1%	31.0%

Survival Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Hardness Blank	10	1	1	1	1	1	0	0	0.0%	0.0%
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 24 Apr-15 16:56 (p 2 of 2)
 Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	12	30	28	24	22	32	24	24	23	20
0	Lab Water Contr	19	43	47	45	41	42	46	42	36	37
6.25		23	37	46	43	25	13	48	48	40	41
12.5		22	42	39	41	45	44	37	47	36	36
25		20	37	35	38	33	42	39	41	39	36
50		15	20	19	25	28	21	17	27	26	14
100		15	17	10	10	13	18	22	17	26	17
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	1	1	1	1	1	1	1	1	1	1
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	0	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Hardness Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 23 Apr-15 17:11 (p 1 of 1)
 Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 05-6322-6353 Endpoint: Survival CETIS Version: CETISv1.8.7
 Analyzed: 23 Apr-15 17:09 Analysis: STP 2x2 Contingency Tables Official Results: Yes

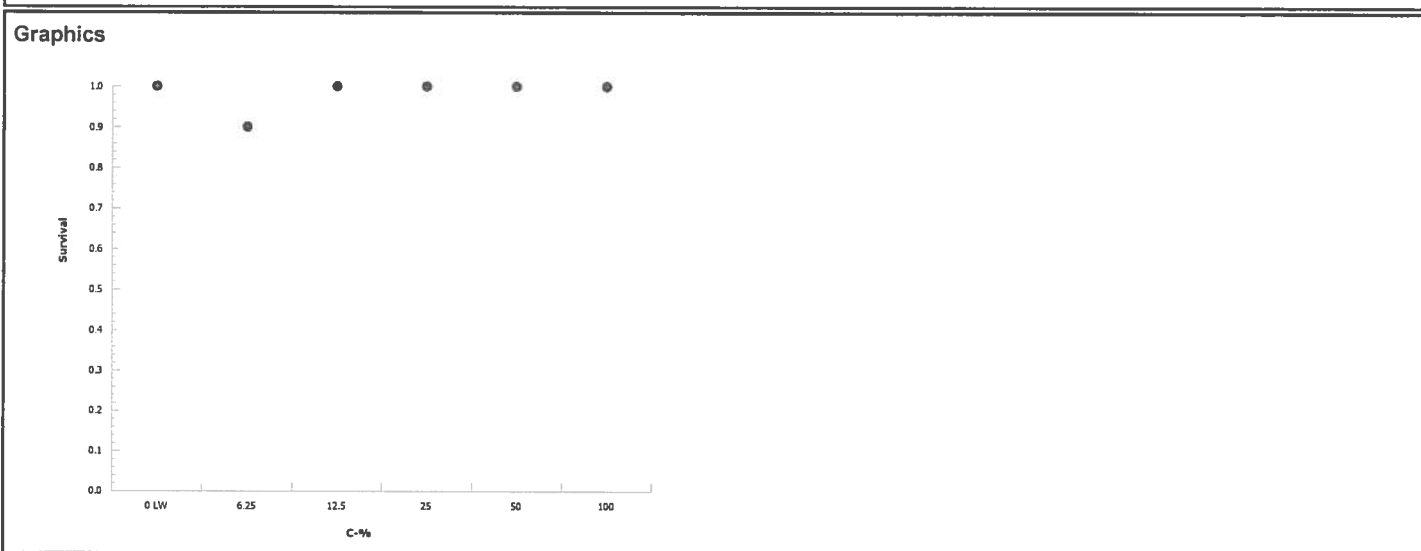
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.5	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 17:10 (p 1 of 1)

Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test					Pacific EcoRisk				
Analysis ID:	10-7567-6941	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7				
Analyzed:	23 Apr-15 17:09	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes				

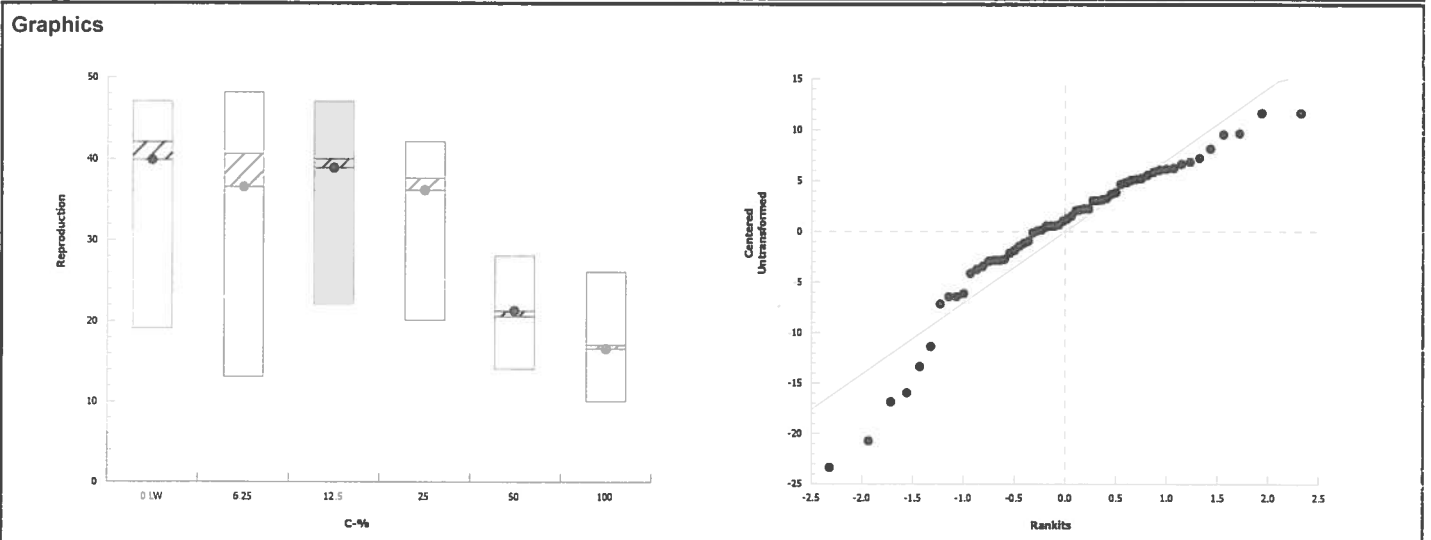
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	19.6%	25	50	35.36	4

Steel Many-One Rank Sum Test									
Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	101	75	4	18	0.7280	Asymp	Non-Significant Effect
		12.5	97	75	6	18	0.5980	Asymp	Non-Significant Effect
		25	79.5	75	4	18	0.0977	Asymp	Non-Significant Effect
		50*	61.5	75	1	18	0.0023	Asymp	Significant Effect
		100*	57	75	0	18	0.0007	Asymp	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4989.933	997.9867	5	17.1	<0.0001	Significant Effect
Error	3143	58.2037	54			
Total	8132.933		59			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance	10.3	15.1	0.0661	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.907	0.946	0.0002	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	39.8	34	45.6	42	19	47	2.57	20.4%	0.0%
6.25		10	36.4	27.8	45	40.5	13	48	3.8	33.0%	8.54%
12.5		10	38.9	33.8	44	40	22	47	2.23	18.2%	2.26%
25		10	36	31.5	40.5	37.5	20	42	1.97	17.3%	9.55%
50		10	21.2	17.6	24.8	20.5	14	28	1.6	23.9%	46.7%
100		10	16.5	12.9	20.1	17	10	26	1.57	30.1%	58.5%



CETIS Analytical Report

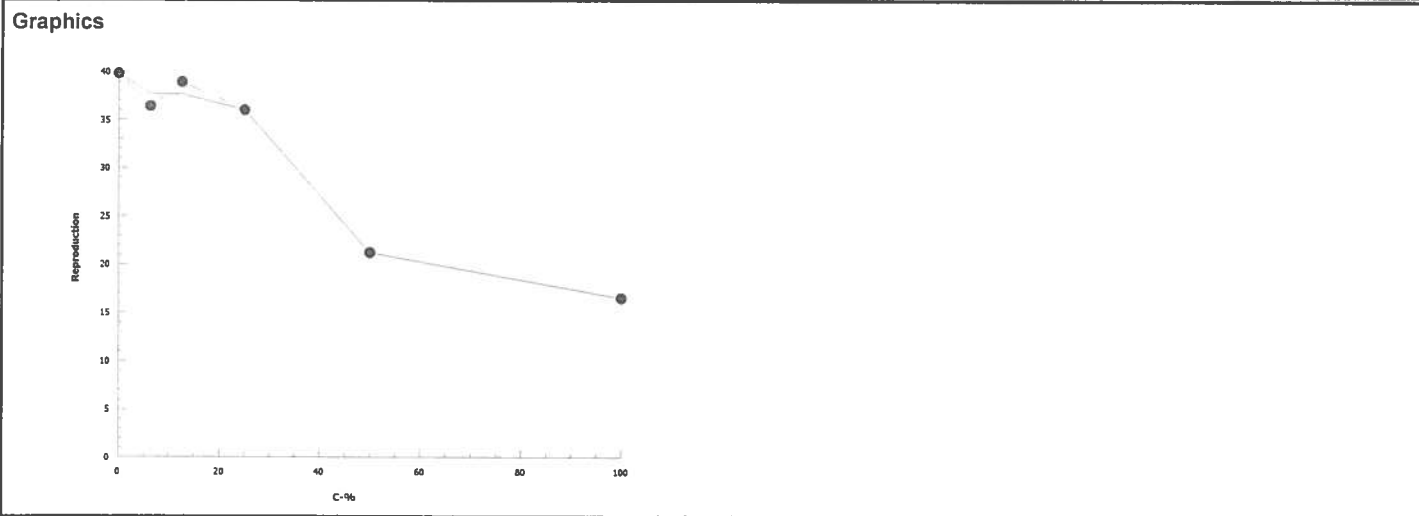
Report Date: 23 Apr-15 17:10 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk	
Analysis ID:	04-5104-7926	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7
Analyzed:	23 Apr-15 17:09	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1086802	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	5.78	1.65	27.9	17.29	3.589	60.48
IC10	25.3	3.31	30.7	3.952	3.254	30.24
IC15	28.7	4.96	33.7	3.489	2.964	20.16
IC20	32	20.4	37.3	3.122	2.678	4.895
IC25	35.4	26.9	40.8	2.826	2.452	3.717
IC40	45.5	39.7	58.7	2.199	1.703	2.519
IC50	63.8	45.9	94.5	1.567	1.058	2.177

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	39.8	19	47	2.57	8.12	20.4%	0.0%
6.25		10	36.4	13	48	3.8	12	33.0%	8.54%
12.5		10	38.9	22	47	2.23	7.06	18.2%	2.26%
25		10	36	20	42	1.97	6.24	17.3%	9.55%
50		10	21.2	14	28	1.6	5.07	23.9%	46.7%
100		10	16.5	10	26	1.57	4.97	30.1%	58.5%



CETIS Analytical Report

Report Date: 24 Apr-15 16:55 (p 1 of 1)
 Test Code: 62230 | 06-8452-4915

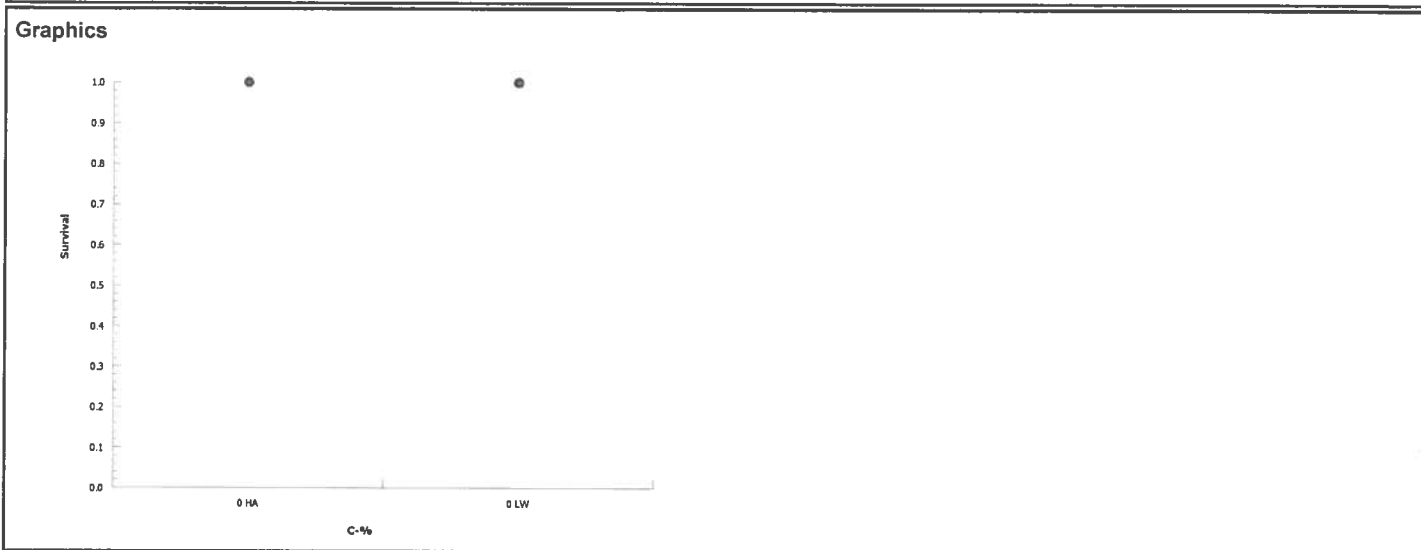
Ceriodaphnia Survival and Reproduction Test			Pacific EcoRisk
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Analysis ID: 10-1550-2479	Endpoint: Survival	CETIS Version: CETISv1.8.7
Analyzed: 24 Apr-15 16:55	Analysis: Single 2x2 Contingency Table	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival

Fisher Exact Test						
Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Hardness Blank	1	1.0000	Exact	Non-Significant Effect

Data Summary							
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Hardness Blank	10	0	10	1	0	0.0%
0	Lab Water Cont	10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 24 Apr-15 16:55 (p 1 of 1)
Test Code: 62230 | 06-8452-4915

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 00-3170-1734	Endpoint: Reproduction	CETIS Version: CETISv1.8.7
Analyzed: 24 Apr-15 16:55	Analysis: Nonparametric-Two Sample	Official Results: Yes

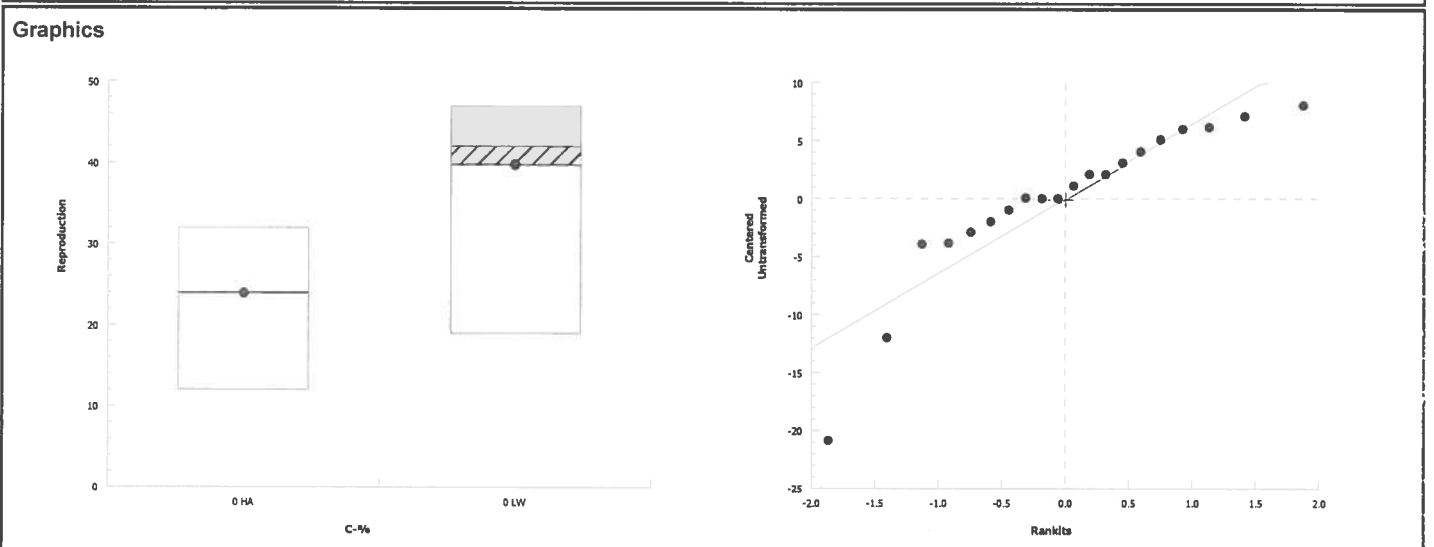
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	Fails reproduction

Wilcoxon Rank Sum Two-Sample Test									
Control	vs	Control	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Hardness Blank	64	NA	0	18	0.0005	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1264.05	1264.05	1	26	<0.0001	Significant Effect
Error	874.5	48.58333	18			
Total	2138.55		19			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	2.11	6.54	0.2803	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.852	0.866	0.0057	Non-normal Distribution	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	39.8	34	45.6	42	19	47	2.57	20.4%	0.0%
0	Hardness Blank	10	23.9	19.9	27.9	24	12	32	1.77	23.4%	39.9%



Appendix H

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh ITS Effluent to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 23 Apr-15 16:57 (p 1 of 2)
 Test Code: 62231 | 11-3663-8196

Ceriodaphnia Survival and Reproduction Test	Pacific EcoRisk
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Batch ID: 14-2313-6191	Test Type: Reproduction-Survival (7d)	Analyst: Drew Gantner
Start Date: 14 Apr-15 14:30	Protocol: EPA-821-R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 20 Apr-15 15:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 6d 1h	Source: In-House Culture	Age: 1

Sample ID: 05-1752-1178	Code: ITSEffluent	Client: Lehigh Permanente
Sample Date: 13 Apr-15 09:40	Material: Influent	Project: 24035
Receive Date: 13 Apr-15 11:40	Source: Lehigh Permanente	
Sample Age: 29h (13.3 °C)	Station: ITS Effluent	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-2457-6691	Reproduction	50	100	70.71	8.68%	2	Dunnett Multiple Comparison Test
20-4958-4020	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-0471-8266	Reproduction	IC5	30	10.8	51.1	3.338	Linear Interpolation (ICPIN)
		IC10	48.8	30.2	64.5	2.049	
		IC15	64.4	49.3	77.2	1.552	
		IC20	79.8	65.8	93.5	1.252	
		IC25	95.3	79.7	N/A	1.05	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	39.7	37.1	42.3	33	43	1.14	3.59	9.05%	0.0%
6.25		10	41.7	39.5	43.9	37	48	0.955	3.02	7.24%	-5.04%
12.5		10	40.1	37.4	42.8	34	46	1.2	3.78	9.44%	-1.01%
25		10	39.2	37.1	41.3	34	45	0.929	2.94	7.49%	1.26%
50		10	36.5	34.3	38.7	32	42	0.992	3.14	8.59%	8.06%
100		10	29.9	27.3	32.5	23	34	1.15	3.63	12.2%	24.7%

Survival Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date:

23 Apr-15 16:57 (p 2 of 2)

Test Code:

62231 | 11-3663-8196

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	42	43	33	43	42	35	38	38	40	43
6.25		48	41	37	41	41	44	40	39	43	43
12.5		41	39	38	37	46	41	34	44	44	37
25		45	39	40	39	34	37	37	41	39	41
50		36	36	36	42	35	38	32	36	41	33
100		28	28	29	34	30	32	27	34	23	34
Survival Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 23 Apr-15 16:52 (p 1 of 1)
Test Code: 62231 | 11-3663-8196

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 20-4958-4020 Endpoint: Survival CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 16:52 Analysis: STP 2x2 Contingency Tables Official Results: Yes

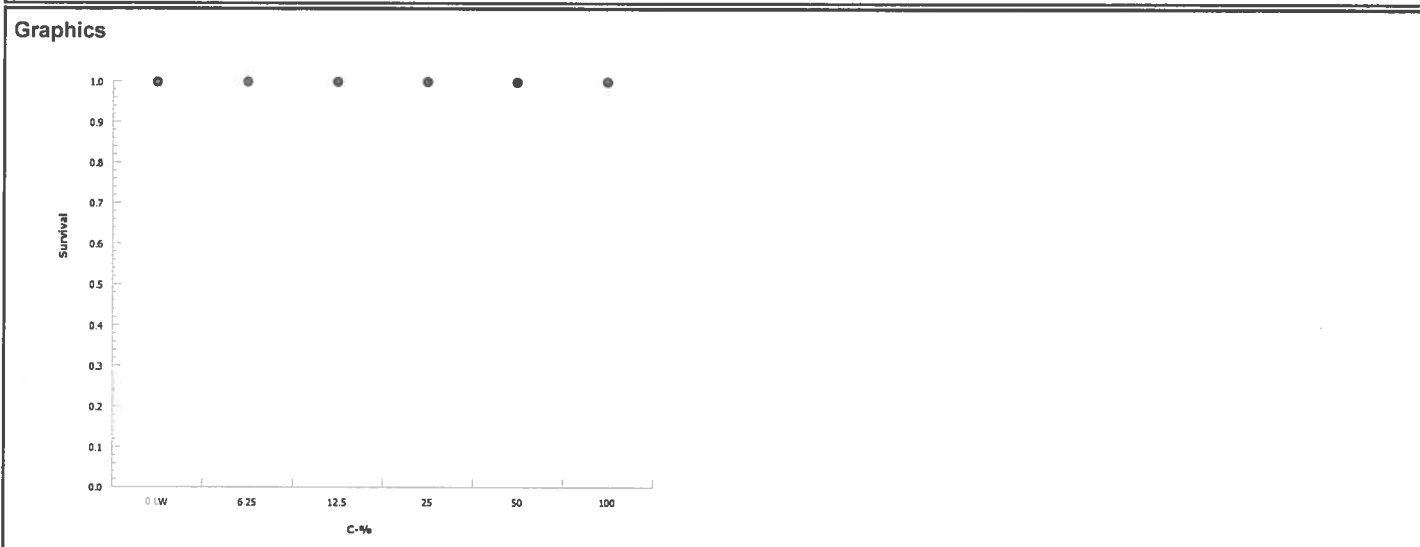
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	1	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 23 Apr-15 16:52 (p 1 of 1)
Test Code: 62231 | 11-3663-8196

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 15-2457-6691 Endpoint: Reproduction CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 16:52 Analysis: Parametric-Control vs Treatments Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	8.68%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	-1.33	2.29	3.45	18	0.9943	CDF	Non-Significant Effect
		12.5	-0.266	2.29	3.45	18	0.9004	CDF	Non-Significant Effect
		25	0.332	2.29	3.45	18	0.7167	CDF	Non-Significant Effect
		50	2.13	2.29	3.45	18	0.0708	CDF	Non-Significant Effect
		100*	6.51	2.29	3.45	18	<0.0001	CDF	Significant Effect

ANOVA Table

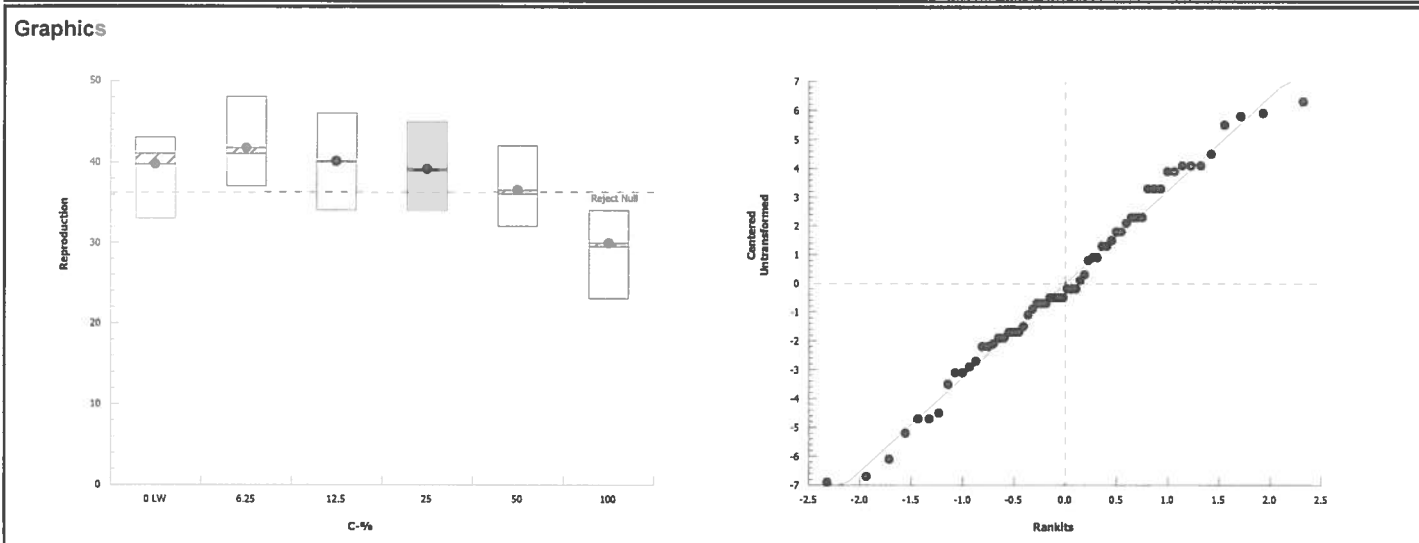
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	901.55	180.31	5	15.9	<0.0001	Significant Effect
Error	612.1	11.33519	54			
Total	1513.65		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.01	15.1	0.9621	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.983	0.946	0.5881	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	39.7	37.1	42.3	41	33	43	1.14	9.05%	0.0%
6.25		10	41.7	39.5	43.9	41	37	48	0.955	7.24%	-5.04%
12.5		10	40.1	37.4	42.8	40	34	46	1.2	9.44%	-1.01%
25		10	39.2	37.1	41.3	39	34	45	0.929	7.49%	1.26%
50		10	36.5	34.3	38.7	36	32	42	0.992	8.59%	8.06%
100		10	29.9	27.3	32.5	29.5	23	34	1.15	12.2%	24.7%



CETIS Analytical Report

Report Date: 23 Apr-15 16:52 (p 1 of 1)
 Test Code: 62231 | 11-3663-8196

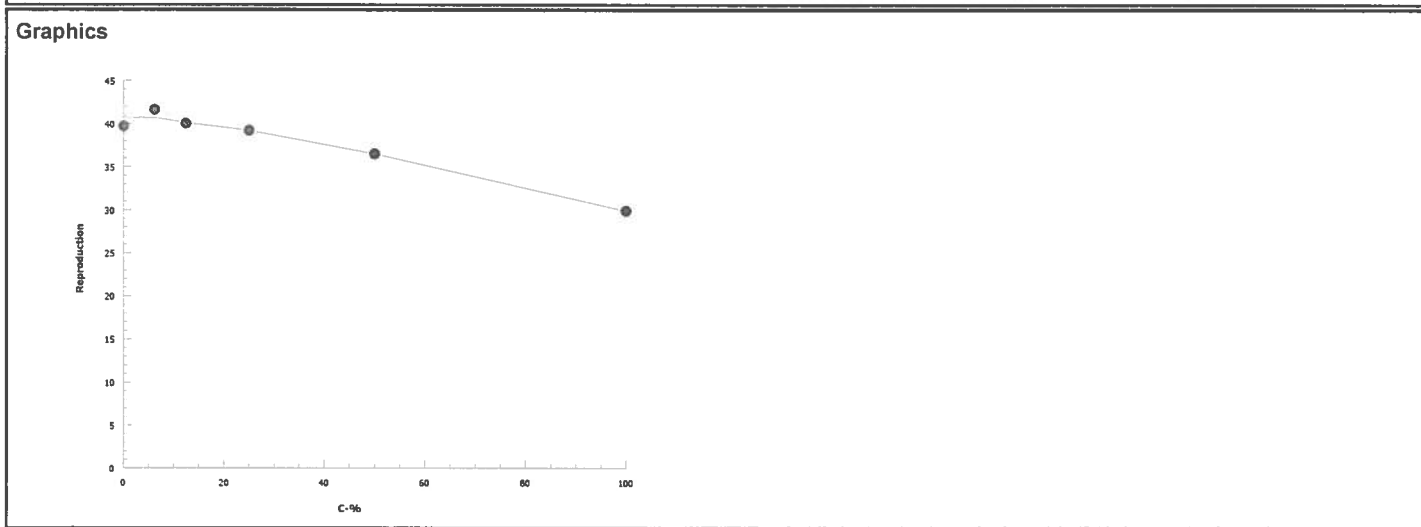
Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 15-0471-8266	Endpoint: Reproduction	CETIS Version: CETISv1.8.7
Analyzed: 23 Apr-15 16:52	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1965100	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	30	10.8	51.1	3.338	1.956	9.225
IC10	48.8	30.2	64.5	2.049	1.55	3.316
IC15	64.4	49.3	77.2	1.552	1.295	2.029
IC20	79.8	65.8	93.5	1.252	1.069	1.521
IC25	95.3	79.7	N/A	1.05	NA	1.255
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	39.7	33	43	1.14	3.59	9.05%	0.0%
6.25		10	41.7	37	48	0.955	3.02	7.24%	-5.04%
12.5		10	40.1	34	46	1.2	3.78	9.44%	-1.01%
25		10	39.2	34	45	0.929	2.94	7.49%	1.26%
50		10	36.5	32	42	0.992	3.14	8.59%	8.06%
100		10	29.9	23	34	1.15	3.63	12.2%	24.7%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: ITS EffluentTest Date: 4/14/15Project #: 24035Test ID: 62231Randomization: 10.6.9Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
Lab Water Control	0	8.20		8.5		320	25.2	0	0	0	0	0	0	0	0	0	0	Date: 4/14/15 New WQ: <u>SVV</u> Test Init <u>SM</u> Sol'n Prep <u>SVV</u> Time <u>1430</u>		
	1	7.89	8.09	8.9	8.5	327	25.3	0	0	0	0	0	0	0	0	0	0	Date: 4/15/15 New WQ: <u>RP</u> Counts <u>43</u> Sol'n Prep <u>YJ</u> Old WQ: <u>RP</u> Time <u>1355</u>		
	2	8.01	8.06	8.7	8.6	321	24.9	0	0	0	0	0	0	0	0	0	0	Date: 4/16/15 New WQ: <u>SVV</u> Counts <u>51</u> Sol'n Prep <u>ME</u> Old WQ: <u>SVV</u> Time <u>1550</u>		
	3	8.38	8.19	8.1	8.1	318	25.1	7	0	0	5	8	5	5	5	5	6	Date: 4/17/15 New WQ: <u>CL</u> Counts <u>60</u> Sol'n Prep <u>TL</u> Old WQ: <u>NB</u> Time <u>1440</u>		
	4	7.98	7.98	8.3	7.8	320	24.2	0	8	3	6	0	0	0	0	0	6	Date: 4-18-15 New WQ: <u>TPB</u> Counts <u>81</u> Sol'n Prep <u>MEP</u> Old WQ: <u>TPB</u> Time <u>1415</u>		
	5	8.02	7.78	8.2	8.5	325	25.0	14	14	12	15	14	16	12	11	12	13	Date: 4/19/15 New WQ: <u>TPB</u> Counts <u>250</u> Sol'n Prep <u>ME</u> Old WQ: <u>TPB</u> Time <u>1640</u>		
	6	—	7.92	—	7.5	343	24.8	21	21	18	23	20	14	21	22	23	24	Date: 4/20/15 New WQ: <u>TPB</u> Counts <u>255</u> Sol'n Prep <u>—</u> Old WQ: <u>SVV</u> Time <u>1500</u>		
	7																	Date: New WQ: Counts Sol'n Prep: Old WQ: Time		
	8									33	43							Date: Old WQ: Counts Time		
Total=								42	43	23	29	42	35	38	38	40	43	Mean Neonates/Female = <u>39.7</u>		
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										Sample ID		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
6.25%	0	8.06		8.2		397		0	0	0	0	0	0	0	0	0	0	38291		
	1	7.90	8.01	8.7	8.2	410		0	0	0	0	0	0	0	0	0	0	38291		
	2	8.13	7.96	8.5	8.0	400		0	0	0	0	0	0	0	0	0	0	38337		
	3	8.25	8.17	8.0	8.0	398		7	5	5	6	5	5	6	6	6	6	38337		
	4	7.97	8.02	8.3	7.5	392		0	0	0	0	0	0	0	0	0	0	38358		
	5	8.02	7.89	8.2	7.9	399		15	14	12	13	11	15	13	13	15	15	38358		
	6	—	7.92	—	7.7	423		26	22	20	22	25	24	21	20	22	22	—		
	7																			
	8																			
Total=								48	41	37	41	41	44	40	39	43	43	Mean Neonates/Female = <u>41.7</u>		

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: ITS EffluentTest Date: 4/14/15Project #: 24035Test ID: 62231Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
12.5%	0	7.99		7.8		470		0	0	0	0	0	0	0	0	0	0	
	1	7.94	8.03	8.2	8.0	476		0	0	0	0	0	0	0	0	0	0	
	2	8.10	8.00	8.2	8.0	473		0	0	0	0	0	0	0	0	0	0	
	3	8.16	8.24	8.1	7.9	469		5	0	0	7	6	6	4	8	7	6	
	4	8.03	8.05	8.1	7.6	465		0	5	6	11	0	0	0	0	0	0	
	5	8.09	8.01	8.0	8.0	471		16	14	15	1	18	14	11	15	14	12	
	6	—	8.00	—	7.8	509		20	20	17	18	22	21	19	21	23	19	
	7																	
	8																	
Total=								41	39	38	37	46	41	34	44	44	37	Mean Neonates/Female = 40.1
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
25%	0	7.92		7.6		603		0	0	0	0	0	0	0	0	0	0	
	1	7.91	8.08	7.7	8.0	615		0	0	0	0	0	0	0	0	0	0	
	2	8.09	8.06	8.0	8.0	604		0	0	0	0	0	0	0	0	0	0	
	3	8.07	8.29	8.1	8.0	594		6	6	0	5	6	6	4	7	6	7	
	4	8.10	8.07	8.1	7.6	589		0	0	7	0	0	0	0	0	0	0	
	5	8.18	8.07	7.8	8.1	599		17	14	13	15	13	14	13	14	13	13	
	6	—	8.01	—	7.9	638		22	19	20	19	15	17	20	20	20	21	
	7																	
	8																	
Total=								45	39	40	39	34	37	37	41	39	41	Mean Neonates/Female = 39.2

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Lehigh PermanenteMaterial: ITS EffluentTest Date: 4/14/15Project #: 24035 Test ID: 62231Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
50%	0	7.87		6.7		849		0	0	0	0	0	0	0	0	0	0	
	1	7.87	8.21	7.6	7.9	861		0	0	0	0	0	0	0	0	0	0	
	2	8.16	8.16	6.7	8.0	852		0	0	0	0	0	0	0	0	0	0	
	3	7.94	8.40	7.1	8.1	851		5	0	5	7	4	7	5	6	7	4	
	4	8.17	8.19	7.6	7.6	837		1	8	0	0	0	0	0	0	1	0	
	5	8.31	8.15	7.5	7.8	846		12	13	11	13	13	12	12	13	15	13	
	6	—	8.08	—	7.7	895		18	15	20	22	18	19	15	17	18	16	
	7																	
	8																	
Total=								36	36	36	42	35	38	32	36	41	33	Mean Neonates/Female = 36.5
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
100%	0	7.85		6.0		1310		0	0	0	0	0	0	0	0	0	0	
	1	7.83	8.31	5.3	7.8	1310		0	0	0	0	0	0	0	0	0	0	
	2	8.22	8.30	7.5	7.8	1305		0	0	0	0	0	0	0	0	0	0	
	3	7.79	8.44	5.7	8.1	1300		5	0	0	4	3	6	0	6	5	7	
	4	8.20	8.31	6.9	7.6	1286		0	6	3	0	0	6	4	0	3	0	
	5	8.36	8.17	7.6	8.0	1291		10	8	12	11	10	12	8	11	0	12	
	6	—	8.29	—	7.7	1342		13	14	14	19	17	14	15	17	15	15	
	7																	
	8																	
Total=								28	28	29	34	30	32	27	34	23	34	Mean Neonates/Female = 29.9

Appendix I

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 29 Apr-15 16:35 (p 1 of 2)
Test Code: 62232 | 07-4287-8382

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	08-6172-4656		Test Type:	Reproduction-Survival (7d)			Analyst:	Padrick Anderson			
Start Date:	14 Apr-15 17:45		Protocol:	EPA-821-R-02-013 (2002)			Diluent:	Laboratory Water			
Ending Date:	21 Apr-15 16:00		Species:	Ceriodaphnia dubia			Brine:	Not Applicable			
Duration:	6d 22h		Source:	In-House Culture			Age:	1			
Sample ID:	15-2137-0698		Code:	NaCl			Client:	Pacific Ecorisk			
Sample Date:	14 Apr-15 17:45		Material:	Sodium chloride			Project:	24036			
Receive Date:	14 Apr-15 17:45		Source:	Reference Toxicant							
Sample Age:	NA (25.2 °C)		Station:	In House							
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
07-7133-8569	Reproduction	1000	1500	1225	17.9%	Dunnett Multiple Comparison Test					
04-1129-7489	Survival	2000	2500	2236	NA	Fisher Exact/Bonferroni-Holm Test					
Point Estimate Summary											
Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method				
20-4313-5637	Reproduction	IC5	683	275	1010	Linear Interpolation (ICPIN)					
		IC10	890	542	1080						
		IC15	1030	760	1160						
		IC20	1110	920	1250						
		IC25	1180	1030	1360						
		IC40	1390	1260	1600						
		IC50	1540	1370	1690						
07-8238-6244	Survival	EC5	1360	841	1590	Linear Regression (MLE)					
		EC10	1460	989	1680						
		EC15	1540	1100	1740						
		EC20	1600	1200	1800						
		EC25	1660	1280	1850						
		EC40	1800	1510	2020						
		EC50	1900	1650	2150						
Reproduction Summary											
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	34.8	32.2	37.4	30	42	1.16	3.68	10.6%	0.0%
500		10	34.6	31.4	37.8	26	39	1.41	4.45	12.9%	0.58%
1000		10	30.4	26.6	34.2	20	36	1.67	5.27	17.4%	12.6%
1500		10	18.3	11.1	25.5	4	30	3.19	10.1	55.1%	47.4%
2000		10	6.7	2.56	10.8	0	17	1.83	5.79	86.5%	80.7%
2500		10	0	0	0	0	0	0	0		100.0%
Survival Summary											
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
500		10	1	1	1	1	1	0	0	0.0%	0.0%
1000		10	1	1	1	1	1	0	0	0.0%	0.0%
1500		10	0.8	0.498	1	0	1	0.133	0.422	52.7%	20.0%
2000		10	0.6	0.231	0.969	0	1	0.163	0.516	86.1%	40.0%
2500		10	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date:

29 Apr-15 16:35 (p 2 of 2)

Test Code:

62232 | 07-4287-8382

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	39	36	34	34	42	35	33	35	30	30
500		28	37	39	26	38	35	35	39	33	36
1000		27	33	35	28	26	34	36	29	20	36
1500		6	24	4	4	27	30	18	24	19	27
2000		8	4	17	11	6	0	0	0	12	9
2500		0	0	0	0	0	0	0	0	0	0
Survival Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
500		1	1	1	1	1	1	1	1	1	1
1000		1	1	1	1	1	1	1	1	1	1
1500		1	1	0	0	1	1	1	1	1	1
2000		1	0	1	1	1	0	0	0	1	1
2500		0	0	0	0	0	0	0	0	0	0
Survival Binomials											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1000		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1500		1/1	1/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
2000		1/1	0/1	1/1	1/1	1/1	0/1	0/1	0/1	1/1	1/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

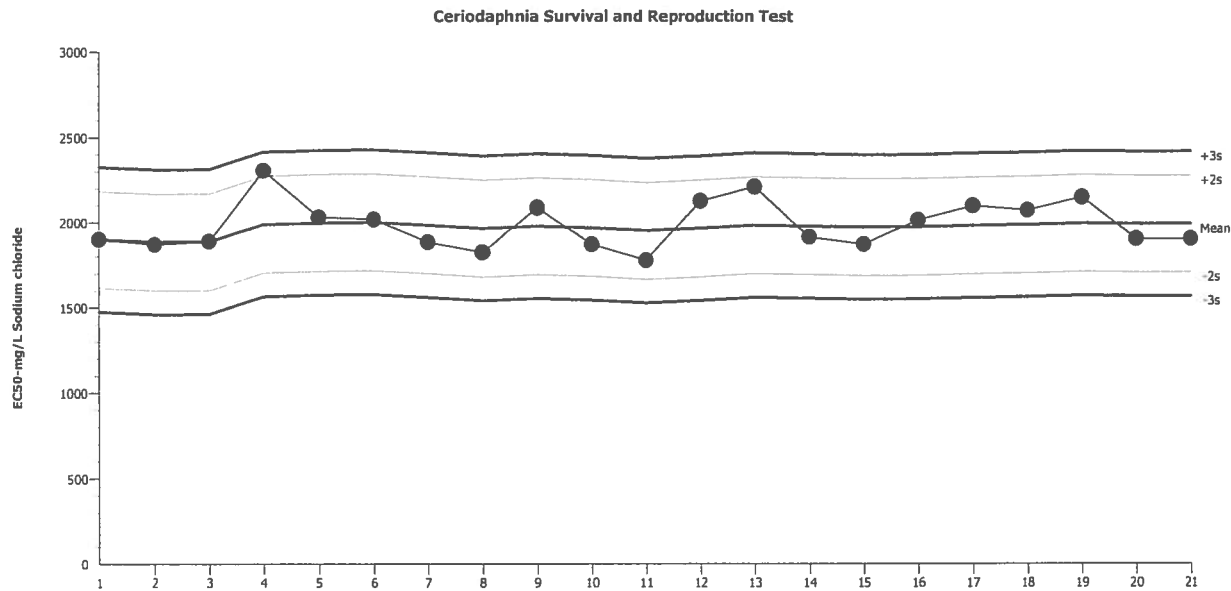
Organism: Ceriodaphnia dubia (Water Flea)

Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Survival

Source: Reference Toxicant-REF



Mean: 1990

Count: 20

-2s Warning Limit: 1706

-3s Action Limit: 1564

Sigma: 141.8

CV: 7.13%

+2s Warning Limit: 2273

+3s Action Limit: 2415

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Feb	25	14:20	1900	-89.54	-0.6314			07-5545-5977	09-9790-2734
2			26	17:00	1869	-121.3	-0.8553			18-8331-2403	20-3499-7643
3			28	13:52	1888	-102.3	-0.7211			13-7932-4759	07-8720-8021
4		Mar	3	13:30	2304	313.9	2.214	(+)		01-6071-4477	20-2561-0282
5			3	13:55	2031	41.47	0.2925			09-0535-3687	08-1412-0035
6			5	13:15	2019	28.9	0.2038			16-1622-9537	00-5183-0879
7			10	14:15	1882	-108.2	-0.7632			03-8930-9354	06-7695-5627
8			11	15:20	1823	-167.2	-1.179			16-6394-6805	20-2552-1985
9			12	14:00	2088	97.6	0.6883			05-9267-0456	09-9220-2291
10			17	14:00	1869	-121.3	-0.8553			10-3243-8385	17-2645-3430
11			19	19:00	1776	-214.2	-1.51			09-0213-7442	15-5008-3697
12			24	14:00	2125	134.7	0.95			13-7900-5600	04-8486-3730
13			26	14:10	2209	218.5	1.541			05-9397-9045	18-9655-5436
14			31	13:10	1913	-77.28	-0.545			20-3429-0018	10-9627-5291
15		Apr	2	15:10	1869	-121.3	-0.8553			14-9686-9242	05-4805-5078
16			3	14:05	2014	24.37	0.1719			09-4937-8674	08-0017-0789
17			7	13:30	2097	107	0.7547			19-2834-8148	13-5670-4061
18			8	15:10	2071	81.13	0.5722			12-2892-6165	14-0015-2491
19			9	14:28	2147	156.6	1.105			04-0146-5443	16-2546-1272
20			10	4:30	1900	-89.54	-0.6314			09-1555-8400	09-5417-3888
21			14	17:45	1900	-89.54	-0.6314			07-4287-8382	07-8238-6244

Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

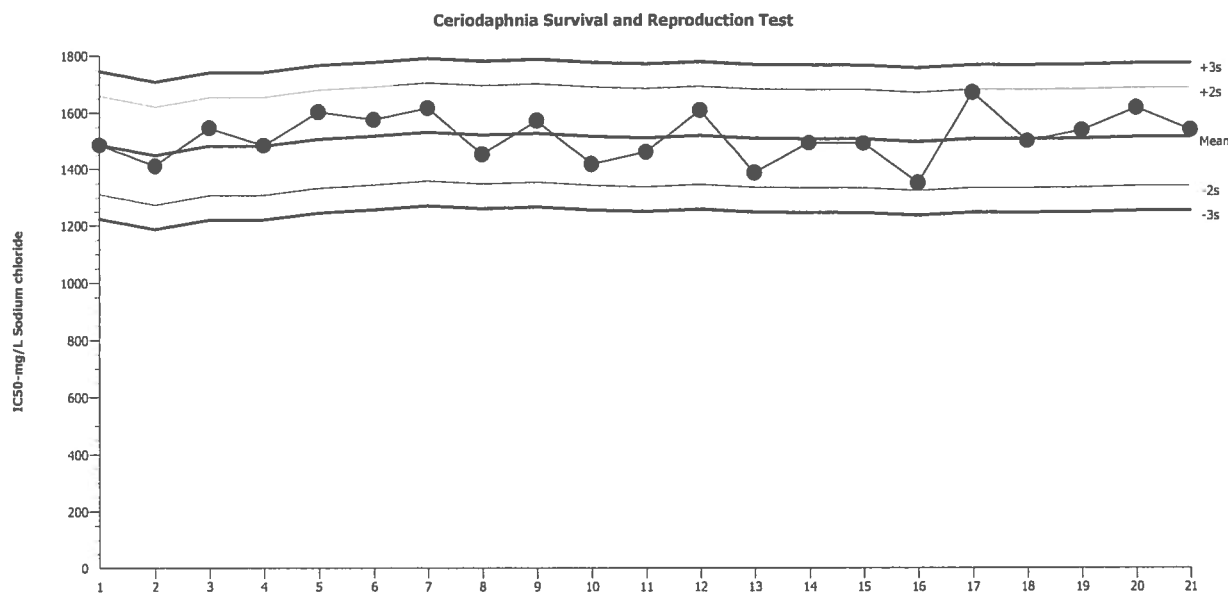
Organism: Ceriodaphnia dubia (Water Flea)

Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Reproduction

Source: Reference Toxicant-REF



Mean: 1513

Count: 20

-2s Warning Limit: 1339

-3s Action Limit: 1252

Sigma: 86.9

CV: 5.74%

+2s Warning Limit: 1687

+3s Action Limit: 1774

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Feb	25	14:20	1485	-28.06	-0.3229			07-5545-5977	01-3014-7131
2			26	17:00	1411	-102.3	-1.177			18-8331-2403	20-6095-4368
3			28	13:52	1546	33.13	0.3813			13-7932-4759	08-0684-6316
4		Mar	3	13:30	1483	-29.79	-0.3428			01-6071-4477	05-9886-8233
5			3	13:55	1602	88.85	1.022			09-0535-3687	19-8366-2925
6			5	13:15	1575	61.74	0.7105			16-1622-9537	16-5368-5572
7			10	14:15	1616	103	1.185			03-8930-9354	08-4782-7608
8			11	15:20	1451	-62.07	-0.7142			16-6394-6805	00-3638-1975
9			12	14:00	1571	58.21	0.6699			05-9267-0456	10-0108-6427
10			17	14:00	1416	-96.78	-1.114			10-3243-8385	16-2290-3397
11			19	19:00	1459	-54.42	-0.6262			09-0213-7442	18-6072-0224
12			24	14:00	1608	94.69	1.09			13-7900-5600	15-6482-1664
13			26	14:10	1386	-126.6	-1.457			05-9397-9045	06-4391-5894
14			31	13:10	1492	-21.2	-0.2439			20-3429-0018	11-5870-3027
15		Apr	2	15:10	1490	-23	-0.2647			14-9686-9242	03-1418-6078
16			3	14:05	1350	-162.6	-1.871			09-4937-8674	12-7898-6855
17			7	13:30	1670	156.6	1.802			19-2834-8148	05-1356-6075
18			8	15:10	1498	-14.89	-0.1714			12-2892-6165	01-4404-4283
19			9	14:28	1537	23.76	0.2735			04-0146-5443	20-4714-9999
20			10	4:30	1616	103.2	1.187			09-1555-8400	12-7453-3348
21			14	17:45	1539	25.79	0.2968			07-4287-8382	20-4313-5637

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client:

Reference Toxicant

Material:

Sodium Chloride

Test Date:

4/14/15

Project #: 24036

Test ID: 62232

Randomization:

A11/10.2.1

Control Water: Modified EPAMH + 5% American River

	Day	pH		D.O.		Conductivity (μ S/cm)		Temp ($^{\circ}$ C)	Survival / Reproduction										SIGN-OFF	
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
Lab Water Control	0	7.95		8.4		322		25.2	0	0	0	0	0	0	0	0	0	0	Date: 4/14/15 New WQ: APF Test Init: YS Sol'n Prep: CD Time: 1745	
	1	8.30	8.10	8.4	8.7	347	376	25.3	0	0	0	0	0	0	0	0	0	0	Date: 4/15/15 New WQ: YW Counts: TH Sol'n Prep: SM Old WQ: KP Time: 1460	
	2	8.36	8.14	8.4	8.1	329	359	25.0	0	0	0	0	0	0	0	0	0	0	Date: 4/16/15 New WQ: SVV Counts: APF Sol'n Prep: CP Old WQ: KP Time: 1345	
	3	7.92	8.85	8.7	8.3	319	372	25.1	0	0	0	0	0	0	0	0	0	0	Date: 4/17/15 New WQ: CL Counts: TH Sol'n Prep: TH Old WQ: CL Time: 1430	
	4	8.08	8.22	8.5	8.2	323	395	24.8	6	6	6	7	8	6	6	3	7	7	Date: 4/18/15 New WQ: MJM Counts: CD Sol'n Prep: KP Old WQ: AW Time: 1435	
	5	7.90	7.81	8.0	8.3	316	363	25.0	12	12	14	12	15	14	11	11	10	11	Date: 4/19/15 New WQ: CL Counts: CD Sol'n Prep: SM Old WQ: PWS Time: 1600	
	6	7.58	8.24	8.8	8.3	349	397	24.8	0	0	14	0	19	15	16	21	0	0	Date: 4/20/15 New WQ: MR Counts: CD Sol'n Prep: CD Old WQ: MA Time: 1625	
	7	—	8.00	—	6.9	—	350	25.1	2	18	0	15	0	0	0	0	13	12	Date: 4/21/15 New WQ: — Counts: PD Sol'n Prep: — Old WQ: PD Time: 1600	
	8																		Date: — Old WQ: — Counts: — Time: —	
Total=									39	36	34	34	42	35	33	35	30	30	Mean Neonates/Female = 34.8	
500 mg/L	Day	pH		D.O.		Conductivity (μ S/cm)			Survival / Reproduction										RT BATCH NUMBER	
	New	Old	New	Old	New	Old	A		B	C	D	E	F	G	H	I	J			
	0	7.85		8.4		1245			0	0	0	0	0	0	0	0	0	0	175	
	1	8.07	8.05	8.4	8.6	1327	1412		0	0	0	0	0	0	0	0	0	0	175	
	2	8.24	8.06	8.7	8.1	1294	1532		0	0	0	0	0	0	0	0	0	0	175	
	3	7.97	8.54	8.5	8.0	1297	1551		0	0	0	0	0	0	0	0	0	0	175	
	4	8.01	8.13	8.5	8.1	1348	1469		5	6	7	5	6	5	6	6	4	7	175	
	5	7.88	7.84	8.3	8.1	1242	1381		10	14	12	8	14	10	13	14	11	11	175	
	6	7.64	8.16	8.9	8.2	1252	1379		13	0	20	13	18	0	16	19	3	0	176	
	7	—	8.03	—	6.9	—	1389		0	17	0	0	0	20	0	0	15	18	—	
	8																			
Total=									28	37	39	26	38	35	45	39	33	36	Mean Neonates/Female = 34.6	

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Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: _____ Reference Toxicant: _____ Material: Sodium Chloride Test Date: 4/14/15
 Project #: 24036 Test ID: 62232 Randomization: A11/10.2.1 Control Water: Modified EPAMH + 5% American River

	Day	pH		D.O.		Conductivity (μ S/cm)		Temp (°C)	Survival / Reproduction										
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	
1000 mg/L	0	7.84		8.5		2200			0	0	0	0	0	0	0	0	0	0	
	1	8.01	8.01	8.4	8.6	2138	2419		0	0	0	0	0	0	0	0	0	0	
	2	8.19	8.05	9.0	8.1	2222	2707		0	0	0	0	0	0	0	0	0	0	
	3	8.04	8.42	9.0	8.2	2217	2879		0	0	0	0	0	0	0	0	0	0	
	4	7.96	8.08	8.7	8.0	2175	2441		4	7	7	6	4	6	4	5	0	7	
	5	7.86	7.87	8.4	8.3	2175	2306		7	11	10	10	8	11	13	14	7	12	
	6	7.70	8.12	9.0	8.2	2250	2502		0	15	18	12	14	17	19	10	0	0	
	7	—	7.96	—	6.7	—	2477		16	0	0	0	0	0	0	6	13	17	
	8																		
Total=									27	33	35	28	26	34	36	29	20	36	Mean Neonates/Female = 30.4
1500 mg/L	0	7.85		8.9		3110			0	0	0	0	0	0	0	0	0	0	
	1	7.96	8.00	8.8	8.6	3090	3414		0	0	0	0	0	0	0	0	0	0	
	2	8.14	8.04	9.3	8.1	3110	3360		0	0	0	0	0	0	0	0	0	0	
	3	8.07	8.38	9.1	8.2	3150	3522		0	0	0	0	0	0	0	0	0	0	
	4	7.91	8.05	8.9	8.0	3100	3489		4	4	7/4	7/4	5	4	5	3	3	5	
	5	7.83	7.76	8.7	8.2	3110	3320		2	11	—	—	10	11	4	11	6	8	
	6	7.75	8.09	9.1	8.3	3129	3387		0	9	—	—	12	0	9	10	0	0	
	7	—	7.93	—	6.7	—	3280		0	0	—	—	0	15	0	0	10	14	
	8																		
Total=									6	24	7/4	7/4	27	30	18	24	19	27	Mean Neonates/Female = 18.3

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

4/14/15

Control Water: Modified EPAMH + 5% American River

	Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction											
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
2000 mg/L	0	7.84		9.1		4020			0	0	0	0	0	0	0	0	0	0	0	
	1	7.93	7.98	9.1	8.4	4050	4800		0	0	0	0	0	1/0	1/0	1/0	0	0		
	2	8.12	8.00	9.6	8.3	4015	4640		0	0	0	0	0	-	-	-	0	0		
	3	8.11	8.33	9.2	8.3	4020	4680		0	0	0	0	0	-	-	-	0	0		
	4	7.91	7.99	9.0	8.3	3943	4744		0	1	4	1	2	-	-	-	3	2		
	5	7.79	7.78	9.0	8.2	4020	4270		2	3	5	4	0	-	-	-	6	4		
	6	7.79	8.07	9.3	8.1	4027	43730		0	0	8	6	1	-	-	-	0	0		
	7	-	7.89	-	7.1	-	4380		0	1/0	0	0	3	-	-	-	3	3		
	8									-				-	-	-				
Total=								8	1/4	17	11	6	1/0	1/0	1/0	12	9	Mean Neonates/Female = 6.7		
	Day	pH		D.O.		Conductivity (µS/cm)			Survival / Reproduction											
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
2500 mg/L	0	7.84		9.3		4940			0	0	0	0	0	0	0	0	0	0	0	
	1	7.92	7.98	9.3	8.6	4940	5620		0	0	0	0	0	0	0	0	0	1/0	0	
	2	8.10	7.99	10.0	8.2	4854	5250		1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	-	1/0	
	3	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	
	4	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	
	5	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	
	6	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	
	7								/	/	/	/	/	/	/	/	/	/	/	
	8								/	/	/	/	/	/	/	/	/	/	/	
Total=								1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	Mean Neonates/Female = 0	